

*Nelson Speech*

# JOURNAL *of* FORESTRY



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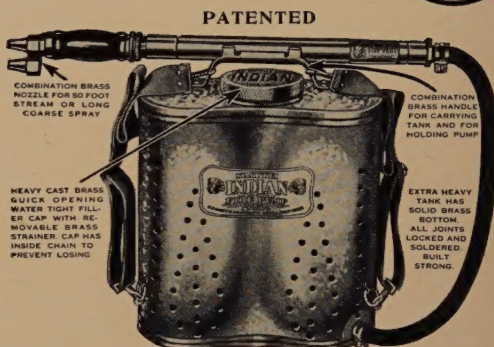
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# JOURNAL of FORESTRY

OFFICIAL ORGAN OF THE SOCIETY OF AMERICAN FORESTERS  
A professional journal devoted to all branches of forestry

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## EDITORIAL

### THE THREATENED TRANSFER OF THE FOREST SERVICE TO THE DEPARTMENT OF INTERIOR

EVIDENCE continues to accumulate that the proposed transfer of the Forest Service to the Department of Interior by executive order is regarded by many well informed persons as a foregone conclusion. The question may well be asked, why has this proposal, repeatedly made of late years and as often rejected by successive presidents, now emerged once more with such confident assertions of consummation?

This measure, from the start, has met with widespread opposition from forestry and conservation interests including the Society of American Foresters, the American Forestry Association, the Association of State Foresters, and various state forestry associations, all of which have recently reaffirmed their position. It has been opposed by the agricultural interests including the National Grange, and the Association of Land Grant Colleges and Universities.

Any attempt to belittle the question by

referring to it as merely a case of inter-departmental controversy utterly fails to explain the situation which is one of outstanding national significance. The true explanation lies in two factors, which have recently been crystallized by Congressional and departmental actions.

The first of these factors is the increasing but belated interest displayed by the Department of the Interior in expanding its activities in the field of conservation coincident with the rapid diminution of its traditional activity of disposing of the vast unreserved public domain to private individuals. This former activity is now approaching the vanishing point by the exhaustion of all lands suitable, and much that were wholly unsuited, to such possession and use. A typical example is the case of the 640-acre stock-raising homestead law passed in 1916<sup>1</sup>, which has honeycombed the open arid grazing lands with adverse claims, and unsuccessful and abandoned ventures in settlement.<sup>2</sup>

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<sup>1</sup>Public Act 290, 64th Congress.

<sup>2</sup>The history of these efforts of the Interior Department appears in the JOURNAL OF FORESTRY for May 1932. "Conservation and the Department of Interior" by H. H. Chapman.

The second and critical factor, affecting this same public domain, is the final passage of the law, Public Act 482—72nd Congress, by which the regulation of grazing on this public domain was given to the Department of the Interior. Conservation of the grazing resources on the public domain may well be regarded as one of the direct and immediate causes of the movement for transferring the 162,000,000 acres of the national forests from the Department of Agriculture. Such transfer would carry with it the entire organization which has been built up by the trained forestry force of this department. This would include its research stations, the Forest Products Laboratory at Madison, Wisconsin, and the extensive coöperation with states and individuals in fire protection, forest planting, wood practices, and forest taxation under the Clarke-McNary Law. It would end the close association with the Extension Service of the Department of Agriculture affecting the 125,000,000 acres of farm woodlands throughout the country.

Conservationists fear that control of the grazing resources on the vast forest areas by a department not traditionally actuated by the intent to preserve the reproduction of timber from destruction by grazing animals, might endanger this primary purpose of the national forests. Under the Forest Service as now constituted, this problem has been handled with the sincere intent of holding grazing in abeyance. It has proved a difficult task, but satisfactory progress has been made. Tipping the scales the other way might weaken this policy and threaten the security of our future forest heritage.

Grazing regulation requires a thorough technical grasp of the operation of natural processes involving the relations of plant growth with animal husbandry, soil conditions, climate, watershed protection and wild life. The Department of Agricul-

ture, based on its primary function of crop production and soil management, is the one branch of the government in which is concentrated the trained personnel capable of intelligently dealing with these problems. The Forest Service not only is manned by a personnel recruited from professional schools which give this basic training in biological sciences, but it now has the advantage of close coöperation with the other large groups of similarly trained men in the Biological Survey, and the Bureaus of Soils, Animal Husbandry, and Crop Production. Coördination of forest and range management is an essential part of the general program of productive land use.

The history of this grazing legislation is as follows: The Forest Service for the past thirty years has been constantly improving the administrative system which has made possible the protection of the small stockmen and homesteaders of the West against the encroachments of large and irresponsible outfits, whose unregulated operations have to a large extent ruined the public domain. On the public domain, by contrast, there has been repeated failure to secure legislation to protect this resource, and progressive, often irretrievable damage to the vegetative cover, accompanied by soil erosion on a huge scale. Impelled by a desire to render such aid as was in their power, in the interests of national welfare, officials of the Forest Service offered their experience in formulating this legislation.

The bill as introduced, which gave to the Interior Department the control, *was drawn by the Forest Service*. In the light of subsequent developments, many conservationists question the wisdom of assigning this responsibility to an untried department. In Congressional committee this bill was so altered, due to the inexperience of officials in charge of the negotiations, that essential safeguard



against a permanent alienation of public rights in this domain were practically eliminated. This led to vigorous protest by the Forest Service, backed by Secretary Ickes, but again, in spite of this protest, the bill was practically ruined and was passed in an extremely unsatisfactory form.

This agitation for a transfer of the Forest Service was then renewed on the plea that it was necessary to coördinate grazing regulation on these public lands with that on the national forests. The writer in 1926<sup>3</sup> called attention to this threatened situation and urged the necessity not only of retaining the grazing administration within the Department of Agriculture, but of placing the regulation of grazing on the public domain also within that Department. If consolidation is necessary this is the only adequate solution which will protect the public interests.

The cardinal error in regarding such a transfer as merely an administrative measure lies in the assumption that the rebuilding of these depleted ranges and the readjustment of the delicate balance between vegetation and grazing can be successfully handled by a department on a purely administrative basis. Claims were made by Secretary Ickes that the cost would be negligible and that the officials of the land office could do a large part of the work. The Department of Agriculture knows better. This job calls for the closest coördination with the scientific branches dealing with all problems of crop production and animal husbandry.

The proposed transfer has other dangerous aspects. What is to become of the farm woodlands totalling one quarter of our entire forest area, and superior in quality to the average? Is it proposed

to create a new Forest Service in the Department of Agriculture for this purpose, thus duplicating effort? Should the interests of sportsmen and game conservationists on the national forests be separated from those of the stockmen, by placing control of grazing in another department? There is also the danger that the national parks, now in the Department of the Interior, might be so diluted and degraded in quality by simplifying executive transfers of large areas of mountain land of only average quality to the status of parks, in order to satisfy local political ambitions, that the unique character of the national park system would be largely destroyed. Let us by all means preserve the status quo, by which national parks remain as outstanding examples of natural beauty, preserved from all forms of commercial use, and not degrade and cheapen this function by confusing it with the broad utilitarian purposes of the national forests areas.

The Forest Service was created in the Department of Agriculture and its success in building up an administration of these forest areas is due to the complete elimination of political influences in appointments, and the resulting cumulative efficiency of its force of 3,000 trained foresters and rangers in solving the complex problems of protecting, reproducing and bringing to fullest usefulness our national forest resources. The profession of forestry and the conservation interests have full confidence in the ability of the Department of Agriculture to maintain this efficiency unimpaired. They do *not* have equal confidence in the result, should such a transfer occur and are unalterably opposed to its consummation.

H. H. CHAPMAN.

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<sup>3</sup>The Future Disposition of Our Remaining Public Lands. H. H. Chapman, Jour. For. 1926, p. 493.

## A C.C.C. SYMPOSIUM

The Editor is pleased to present the following five articles as a symposium on the Civilian Conservation Corps. They present a cross-section of fact, opinion, suggestion, and criticism. They represent also a cross-section of authors, for here are a C.C.C. foreman, a project superintendent, a state forester, a general inspector of ECW and a former liaison officer now handling C.C.C. policy in Washington.

Here we have the reactions of five men who have been long and closely associated with the C.C.C., and whether one agrees or not with their statements or conclusions, it must be admitted that they speak sincerely and largely from first-hand knowledge.

The Kentucky foreman has definite ideas for much needed improvement of the educational program, the California superintendent offers concrete suggestions for better organization, the Connecticut state forester looks ahead to a permanent C.C.C. and sets down his ideas of how the set-up might be bettered. The general inspector rather severely arraigns the foresters for their lack of social vision and points out where they might well profit by the experience of the much older profession of Arms, and lastly, there is a plea for the integration of C.C.C. operations as a means of accomplishment of a realistic forest policy as a part of the national land plan under formulation by the Natural Resources Board.

### MAKE THEM CONSERVEES FOR LIFE

By GEORGE H. HIERONYMUS

*Foreman, C.C.C. Camp P-52, Kentucky*

IT IS remarkable how articles relating to the C.C.C. work have pervaded forestry journals and publications during the last twelve months. But is this anything more than the expected situation when an organization, fighting to hold its own, finds that it has overnight come into vast wealth? That sudden wealth, by its quantity and novelty, has drawn this flood of publicity in fact and opinion to the forestry publications. This is another article relating to the C.C.C. movement, but with a different phase, another appeal.

I am a foreman, commonly called a forester, in a conservation camp. Having been in this organization since near its beginning, I have seen it grow from a "dogie," which seemed to be all legs and little coordination, to a "sleek yearlin' past." I have been in different camps with different companies. The rookies have come and gone. By contacting more or less intimately hundreds of the enrollees, I have come to know them, to

know in a measure their mode of thinking and their reactions.

This near-pauper organization which found itself in sudden wealth was none other than the U. S. Forest Service. I do not wish to draw the ire of the forestry personnel by rating the Service in such a manner, for I hold this body and its activities in greatest respect. I simply mean conservation and development of American forests have been retarded for lack of funds, and especially for lack of workmen in the field.

What a spectacle we had when the Forest Service found itself a veritable kid on Christmas morn, after the Emergency Relief Administration had filled its stockings with funds never hoped for and best of all, 360,000 men, not to mention supervisors, equipped and transported to the field of activity.

Here we have the Forest Service, a permanent organization; and we have the Civilian Conservation Corps, a temporary one. The relations existing between these



two groups present some very interesting aspects.

All the progress made by the Forest Service since its beginning has been brought about by a group of thinkers who were by far in the minority. Because nature has endowed us with an abundance of timber and forest products, an opinion for conservation has never been developed in the majority. Is it possible to make sure progress in any governmental endeavor without the sanction of the majority of the people? Certainly a greater measure of progress can be had when any program is backed by a citizenry of one mind.

In forestry groups, the term "forest-mindedness" is becoming a trite expression. But the term expresses the need exactly. Is America forest-minded? Definitely, no! Certainly there is a growing per cent of the people headed in that direction, but as a whole, we are far short of that goal which should be the aim of every true forester, ranger, lumberman, sportsman, naturalist, citizen. We must stick to that trite term. We must drag it through its period of uncertainty. We must set it up as an objective and work to see it attained.

A short time ago, in an address made by Chief Forester Silcox, I heard him say with special emphasis, that every true American should feel indignant at the waste and devastation of our forest wealth. I heard him make a plea to a group of foresters that they feel and express a passionate indignation at this ravaging and destruction of our kingdom of trees.

I did not call it passionate indignation, but I am sure I felt and expressed it when as an instructor of vocational studies for high school boys, I gathered a group of them around me each year and tried to make them see the great need for good foresters and the opportunities for service in the work. I think I felt

this same indignation when I saw the denuded portions of our northern forest areas. I felt it more keenly when I traveled through the beautiful Sihlwald of Switzerland and the well-kept Schwartzwald of Germany. You can be assured I felt double-indignity when time after time I led groups of C. C. men into the smoke and flame, the danger and torture of forest fires, to try to right the wrong done by some ignorant one who carelessly and criminally fired the woods. It is true that we have recently showed progress toward recognition of the need for forest conservation. Schools have begun to show a little interest. Tree and forest associations are doubling efforts to reach the public and men's and women's clubs are appointing committees on conservation. But I make the statement that the biggest opportunity for sowing the seed of conservation in the best soil for sure germination and rapid growth is being largely neglected. We are passing up the opportunity of selling the idea of conservation at a low price to the public. The offer for free advertising that will reach every nook and corner of the country is being partially thrown away.

In the CCC camps that I know, a condition exists which seems to be typical for camps in all parts. Rookies come to the camps for a term. They come because their families must have their wages to live. These boys are thinking of their work; how hard it is going to be, and of the possibilities for a rating in order to get the few extra dollars allowed to a few each month. They are thinking of camp life, their clothes and equipment. The rules and regulations take a great deal of their thought. They are interested in sports, in making their camp clean and beautiful. This is as it should be. They must be busy thinking and doing. But wait. Their thought and interest should extend beyond this



camp center. They are in an organization designed for conservation, and there should be a set-up which would keep before them constantly the idea of conservation and its true relation to our national existence.

The work done brings them into a sort of relation to forestry. Truck trails are being made through the woods, check dams are being made on worn-out land, but this work is often far removed from larger forest areas and there seems to be little connection to conservation as a whole. In national forests, the work has a closer relation to plans of preservation, but on private land, the work in itself takes the enrollee no further than the completion of the individual project. Since about half the camps are out of federal forest and park areas, approximately half the total men enrolled do not come in contact with organized work as practiced in national forests. Then it behooves the supervisory personnel of camps on private land to bring the enrollee closer to practical conservation by means other than the work.

Wouldn't it be a sad plight if the majority of the men enrolled in the Corps should return to their homes and communities and not take with them this indignation at the disappearance of our forest resources? This will be the case if special emphasis is not used in teaching them fundamentals of forest preservation.

Educational departments are not stressing forest study as they should. Many of the camps have set up elaborate curricula and have enrolled only a relative few in forestry classes. Reports made in official CCC publication show that some camps do not include forestry at all in their programs. So-called junior college set-ups in some camps offer courses in journalism, sociology, physics, vocal training, and dramatics and do not

mention any course relating to conservation.

In camps with which I have been associated, there has been only one special agent to tell the boys about existing conditions, current needs, and general work of the Forest Service.

This agent, with a good lecture, illustrated by slides, got more favorable comment than any I have heard. Hundreds of enrollees have come and gone since then, but they have not had such an opportunity.

Why not have more lecturers and special educational men who have a message for the thousands of boys? Why not send men from camp to camp to tell the story over and over so that every conservee can hear it? In the future, the work done by these boys will be largely forgotten. It is so located and of such a nature that it is not before the public. If there are a million young men fired with enthusiasm for forest conservation, this cannot pass. The seed sown will ripen into a nationwide interest and possibility for a harvest of helpful legislation. We can do now what the little red school house has failed to do. We can reach our last public through the medium of the enrollee. We can educate him by beginning with the Forestry Primer. Every man should be required to take an elementary course in forest conservation. In ten well-planned lessons, under an instructor who knew his subject and who had the wish to pass the good word along, these men could be made to realize the need for national interest and activity. The Army has made a course in First Aid compulsory. Why could not those in authority make it obligatory for enrollees to take a course in conservation?

Bulletin boards in camps should be covered with posters and materials related to forestry and reading tables should be well supplied with magazines



and bulletins. Librarians and educational advisers should recommend proper books from the permanent libraries.

Every enrollee should go back to his home community full of enthusiasm for a program of conservation. He should tell his neighbors and friends about it. And in the future, he should help to con-

trol legislation concerning forest needs.

Of course this is an Utopian idea, but if everyone involved would coöperate and double all efforts for proper and persistent education, the majority of the boys could be won over. Let's all try to make the enrollee truly forest-minded and a conservee for life.

### "THIS WORK MUST GO ON"

BY LEON G. JOHNSON

*Project Superintendent, C.C.C. Camp, Tahoe National Forest*

BACK through the forest toward camp and home move groups of bronzed, strong young Americans. They are cheerful, tired and happy. There has been a hard day of work amongst the pines of California, and in their hearts there is a feeling of fellowship and security in the future. They are happy and proud of their accomplishment, and the thought of being well cared for, well fed, well thought of, makes them congenial and carefree.

To any one having had the experience of aiding such a group there is a vast difference from that memorable day in May, 1933, when the C.C.C. plans in their barest forms were laid, when not one spark of comradeship or coöperation existed, to the present where it is possible that 150 young Americans are able to come home to comfortable quarters, good meals, and sufficient recreation.

Little did I realize when given a hand-full of blue prints on that day—May 15, 1933—by the forest supervisor with the statement, "Here's the dope, go to it," that I was going to be called upon to use all the stored-up knowledge of years of a "Jack-of-all-trades." Such proved to be the case as the work progressed. The Civilian Conservation Corps business was new and no one seemed to know what it

was all about. It was all worked out, however, with the support and coöperation of a good, level-headed, regular United States Army captain. A partnership was established immediately. Barely had the tents been erected by the advance detail when truck load after truck load of lumber began to arrive. Day and night lumber and material came and with forty-nine men and four Forest Service structural foremen, construction of the first C.C.C. Camp in the Tahoe National Forest was begun. It rained and it snowed but the lads worked between storms to complete their camp. Here is where the spirit, the vim and vigor of this camp, which has prevailed throughout the entire period, began. Hardships were met cheerfully, and on more than one occasion a boy competent to drive the "Caterpillar" was awakened in the night to pull a truckload of lumber from the mud. Every one sacrificed and was happy.

In two weeks' time all buildings were completed, built by inexperienced boys from the cities, small towns, and country. In time the new men began to arrive—158 of them,—thus completing our complement of 200. Everything was in readiness, water and sanitary systems, showers installed and in working order. Wood

was needed and this afforded an excellent opportunity to teach the novices in the use of axes, sledge and wedge. Camp was located in the center of a 14,000 acre burn covered with dry oak. Each foreman was instructed to take his crew, scatter them, and assist each lad in the proper use of tools. Double-bitted axes were the order of the day and fear was felt by those in charge that accidents might occur, but under the guidance and instructions of the foremen these same inexperienced boys soon not only became efficient but good woodsmen.

And through the days, weeks, and months, these boys, members of the nation-wide C.C.C. movement, worked. Various projects that had been for many, many years left undone began to take on their finished form. Now as the movement nears the close of its third six-month period, I may say without fear of contradiction, a great world of good has been accomplished. The forest has been benefited in a way that otherwise would have taken ten years to have completed. Truck trails, roads, firebreaks, roadside clearing, improving campgrounds, fire fighting, planting trees, and many other operations that were accomplished will in the future place America first among the nations of the world in the care of its forest resources.

The boys have benefited. They have learned and experienced many trades of which heretofore they had never dreamed. Operating compressors, jackhammers, caterpillar tractors, manipulating graders, scarifiers, tool sharpeners, these and many others have offered opportunities to the trained and untrained. Through it all these young men have been satisfied. That is the feather in the cap of the individual men who are in charge of the distinct camps. We have other labor programs where great strides are made, but nowhere, whether it be at home or

in foreign ports, city or country, has there been a more suitable, satisfied atmosphere than exists among the members of America's C.C.C. camps. Truly this fact is a gratifying thought to those of us who have aided in the struggle.

To one who has been connected with the "picture" from its beginning one word has become law, and that word is the all-important one of "Coöperation." There must be coöperation before there can be in foreign ports, city or country, has absolute harmony. Each in turn—the Army and the Forest Service, the commanding officer and the project superintendent, the project superintendent and his foremen, the foreman and his leaders, even the leaders and their workers—must instill the word coöperation and the acts of team work in the minds of all. Only then, and then only, will a successful camp and a group of contented, satisfied men be found.

Perhaps in the mind of some reader there is yet some question of just exactly how one of our numerous camps is handled. First, may I emphasize the one point that I stress and try to impress upon the minds of the boys from the time that they arrive, namely, that they will be held upon a standard that men are held. Theirs will be work of men and all thought of vacationing and charity must be driven out. They have come in to the forest to work. Proper care will be given them. Proper clothing will be supplied. All the proper facilities that go with healthy living will be furnished. Opportunities to learn and to develop will be offered; friendliness will be the key-word of each day, and every promise is carried out; the expectation of the group is fulfilled.

The Army is given the duty of feeding, clothing and providing generally for the welfare of the enrolled. To this branch of service is given also the task of enrolling the members (after selection by



the Labor Department), and through their fiscal agent the allotted amount of money is designated and mailed to the dependents. The Army usually have blanketed their work in a manner similar to this: Under the commanding officer at first were three officers, usually lieutenants. One, the second in command, usually serves as mess officer, and to him is entrusted all purchasing of food commodities, to him is brought all matters that deal with the transportation of the Army unit, and his authority is that of a second in command. One lieutenant is usually the welfare officer. He may be also the supply officer and is placed in command of groups of men that sometimes establish sub-camps aside from the main camp. The all important health of the enrollees is taken care of by the medical officer. These four men (now reduced to three) carry out the Army function in a C.C.C. camp.

Coöperating with the Army is the project superintendent—the Forest Service representative. To him falls the lion's share of the duties of the work project. A good superintendent plans the field work, organizes his foremen, and distributes the men. The necessary functions that are essential to the smooth running of the machine is his outlook. The tools, equipment, trucks, projects, and records are all supervised by this one person. To coöperate means success. Not to work together spells dismal failure.

To show further how closely webbed these two units are and how utterly essential it is that they coördinate, let me mention one incident in the span of C.C.C. work. No other portion or factor of this whole movement can show the true spirit of the Corps that has developed among the men of the organization than the following:

In the summer after long days of blazing sun the forest becomes dry, and

forest fires are a real menace to their existence. In some remote region of the woods a fire starts and gains headway and momentum rapidly. Now if I were only able, I would convey to you the drama that is enacted in the days that follow. No greater spirit of sacrifice, no more enduring stamina, no more pure nerve and courage is or has ever been displayed by any one group than is shown by these same men who have been given a new outlook on life by this movement.

The camp is quiet—let us say it is in the wee hours of the morning. The telephone rings, once, twice; in the office an enrollee sleeps next to the instrument. In the quarters of the superintendent another telephone is close by. Despite the seriousness of the situation there is keen rivalry and a bit of comedy existing between the superintendent and his clerk. The phone rings once again and from their beds both scramble in a race toward the wall.

"Hello!"—it is the voice of the clerk, eager in his boyishness to live up to his responsibility. "Hello!"—it is the voice of the project superintendent not to be undone by his younger rival.

"Hello, Bigelow speaking! Johnnie, there's a big one at Onion Valley."

"O. K. How many do you need?"

"Better send a hundred and food to last four days."

Thus briefly is ended the conversation between the superintendent and his superior. Brief are the words but the spirit is not lost. In the dead of the night one hundred boys are to be awakened from their slumbers. They must be fed and food provided for an undetermined number of days; this is the task of the Army. If they hang back, the crews will be delayed and probably failure result. The boys awake; one or two grumble but from another partially dressed comes the words, "Ah, you can't take it." Here is

the true spirit of the movement. Here is shown the drive and faithfulness of the boys. What matters if they are tired; what matters if their bodies need sleep; who cares if they have just returned from two long days of fire fighting. As soon as one individual begins to weaken, from the lips of another equally as tired comes the motto of the outfit, "You can't take it." These four words—what a world of meaning they carry. All thought of weariness is forgotten, lagging feet move faster, shoulders hunch and the answer comes back, "Sure I can take it." It's always the same.

They breakfast slowly, but at the sound of the gong they move eagerly to the Forest Service trucks. A sufficient number of trained Forest Service foremen are placed at their head. Following roll call, the caravan proceeds to the site of the fire where the same spirit exists. On the fire line the boys work; woe to him that lags intentionally. Hunger, lack of sleep, weariness, all is endured without whine or grumble. Truly they can take it!

In summary, because I have been with the movement from its first day, and because I am interested and have at heart the wish for the advancement and perhaps the permanency of the organization, I wish to express a few constructive criticisms that I sincerely feel the organization will benefit by: First, Frederick the Great long ago wisely said, "An army goes upon its belly." May I use the same phrase and say the C.C.C. existence depends upon its stomach. To my mind the feeding facilities should be reformed. Let us abandon entirely the present hit and miss idea of drawing from the rank and file of the company roster the men that appear the most likely as cooks. Men that are selected in this manner, it is true, bend every effort in their attempts to satisfy; but never, never could they reach that degree of skill that an experienced cook

has attained. If this is true, why shouldn't we go outside of the enrollees, hire honest-to-goodness men who are cooks and know their business. Let us pay them more, let us appropriate a sufficient wage, but let us also demand of them services for which they are worthy, lacking which they shall be discharged. I believe in the long run this method will be cheaper because it will require that where there are now four or five \$45 or \$36 men, there would be two higher paid men and one of a trifle less wage. The food would undoubtedly be better and the men more satisfied.

Second, the so-called "red tape" over the method of enrolling men should be abolished. Under the present system a certain number of men is allotted to certain camps for a period of six months or less. In case one-third of this number should be discharged for one reason or another, the project superintendent must continue with the reduced number until the end of the period, before he may obtain others in their places. This not only short-hands the superintendent but it delays the project, and also hinders the employment-recovery plan. Some method should be employed to keep the company up to full strength at all times by enrolling men as needed. Third, I recommend that adequate modern heavy equipment be obtained and used for the C.C.C. camps. Enrollees would be given extensive training in the operation and use of modern machinery, thus preparing themselves for future civil employment as well as enlarging the scope and usefulness of the work program. Air compressors of the truck-mounted type and modern, self-contained road maintainers would be particularly advantageous. Fourth, keep politics out of the C.C.C. set-up. It is very disconcerting and unsatisfactory to all concerned to "Eenie-meenie-minee-mo" through a list of applicants



when in search of a replacement for a vacancy occurring in the facilitating personnel. Team work in this group is very essential to the project superintendent. Let the men be selected on a basis of qualification rather than the so-called spoils system. I further believe that more adequate means of recreation should be planned and properly executed.

In closing I would like to make this

final statement. No other work or activity that I have ever been interested in or attached to has so completely captured my interest and sincere aid in backing as this American C.C.C.

Truly this kind of work must go on, for from it the America of tomorrow is rising. In that tomorrow the forests of the United States will have profited ten-fold.

## READJUSTING THE C.C.C. AS A PERMANENT SOCIAL FACTOR

BY AUSTIN F. HAWES

*State Forester of Connecticut*

AMONG the various measures which make up the New Deal there is none which has met with such universal approval as the Civilian Conservation Corps. This movement aimed especially to benefit young men, and the allied movement for transient camps which aims to benefit older men who have been buffeted from place to place, should undoubtedly become permanent institutions. They should be reorganized as permanent rather than emergency measures with emphasis upon social betterment rather than upon relief. These two organizations together could employ at least a million men to good advantage and at a relatively low cost compared with much of the relief work.

From the social standpoint the main criticism which can be made of the C.C.C. is that it has given temporary rather than lasting relief to the young men and their families. While it has built up thousands of men physically and in other ways, it has done comparatively little to train them for a life work. The educational opportunities have been largely neglected and have not been greatly improved by the present system of educational advisers.

## PURPOSE OF C.C.C. MOVEMENT

We may concede that the main purposes of the C.C.C. as it has been operated have been: to furnish relief to needy families; to build manhood; and to secure accomplishment along various conservation lines. To the above should be added: The training of the men for a useful and happy life. Since the greatest opportunities for the future seem to lie in some form of subsistence home-stead and part-time employment, why not use the C.C.C. as a training school for that kind of life? Many of these young men have become interested in forestry, in insect control or in some other allied lines, but there has been no opportunities for them to continue in the work after the expiration of the first year. Although the most efficient work can be obtained by keeping men on the same job month in and month out, I believe that a greater benefit would result to the Nation if men could be rotated so that they would get an all around training.

## THE ENROLLEES

Everyone realizes that forestry education in this country has been top heavy.

Our schools have not produced an intelligent forestry-minded working class such as exists in Europe. The C.C.C. offers an opportunity to rectify this shortcoming. The selection of the junior enrollees may well be left to the relief agencies as at present, but the administrative officer, in most cases the state forester or federal officer in case of national forests or park camps, should have power to select the "local experienced men" with a view to securing mature experienced men who will be helpful in the various activities of the camps whether as choppers, assistant cooks, barbers or what not. The word "local" should not be applied too literally. These men would supplement the supervisory personnel in giving the juniors practical training and should be subject to replacement if they prove unsatisfactory. The best estimates I have seen place the cost of the C.C.C. to the government at about \$5.00 per man-day. Experience with the transient camps has demonstrated that it is not necessary to pay men \$30.00 a month in addition to keep in these times. I believe that the pay of enrolled men could be reduced to \$25.00 or even \$20.00 a month, of which the dependents would receive the greater part as at present. The salary of assistant leaders might be \$30.00 instead of \$36.00 and this should be the only grade to which men could be advanced during the first year.

If a policy were adopted of retaining at the end of each year a nucleus of the best men for promotion, we should gradually build up a corps of intelligent forest labor. Thus at the end of the first year we might have ten per cent promoted to the rank of leader at \$45.00; at the end of the second year one-half of the leaders promoted to the rank of sub-foreman at \$60.00 a month. Thus during the third year under such a system with a total force of 500,000 men we would have a distribution somewhat as follows:

### Total Monthly Payroll

325,000 junior enrollees @	
\$20 a month.....	\$ 6,500,000
50,000 local experienced men	
@ \$30 .....	1,500,000
50,000 assistant leaders @	
\$30 .....	1,500,000
50,000 leaders @ \$45.....	2,250,000
25,000 sub-foremen @ \$60..	1,500,000
	<hr/>
	\$13,250,000

### CAMP MANAGEMENT

At the recent meeting of the Association of State Foresters held in Knoxville, it was made clear by Director Fechner that the Army considers its connection with the C.C.C. valuable experience for the officers. It is therefore assumed that the Army will continue in charge of the camps. The relationship between the Army and forestry personnel may be improved if the superintendent assumes entire responsibility for furnishing the camp with fuel wood and if the competition formerly fostered by the *Army and Navy Journal* is omitted. This competition between camp commanders often resulted in friction because of the desire of the commander to secure men for various jobs about camp without having them charged against his camp overhead. The Association of State Foresters urged that the Army be authorized to employ trained cooks in the camps since the poor food is often a cause for dissatisfaction among the enrollees. It is believed that the saving in food would more than compensate for the cooks' higher salaries.

### SUPERVISION AND EDUCATION

The position of superintendent should be made permanent and worthy of a high-





Fig. 1.—Proposed layout for a permanent C.C.C. camp.

grade man. He should be furnished a cottage near the camp where he could live with his family and should be able to look forward to a salary of \$3000. He should be responsible for all educational, religious and recreational activities in the camp. The present system of educational advisers is unsatisfactory because it has no relation to the work projects and because the Army officers are constantly changing and cannot take the interest in education which a more permanent superintendent would take. Each work project should be made educational. Every man who leaves a camp should be able to do simple carpentry, masonry including cement work, blacksmithing and road building. He should also be a fair wood chopper and sawyer. The state administrator should have authority to employ experts in arts and crafts and other subjects of both theoretical and practical knowledge; also lecturers and recreational leaders who would go from camp to camp directing class work, giving lectures, arranging plays, athletic contests, dances, etc. Undoubtedly arrangements could be made with the state university to take over most of the educational work. A certain amount of class work should be required of all men. They do not attend voluntarily. Elementary work in English, arithmetic, American history, civics and allied subjects should be required. Suitable arrangements should be made in the camps for class room work including adequate lighting for study.

It should be a part of the duty of the camp doctor to make frequent inspection of the work crews and see that the work is conducted as safely as possible. At present the company doctor rarely, if ever, visits the work projects.

#### CAMP ARRANGEMENTS

Since there will always be a limit to the amount of work which can be done

from one camp, the camps in many sections should be built with a view for recreational use after they are discontinued for C.C.C. occupancy. Without materially increasing the expense, new camps could be built in the form of attractive villages, no barracks to accommodate more than twenty-five men. With a superintendent's cottage somewhat apart and a rather better barracks for the other supervisory personnel such a camp would be an attractive recreational center for future use. The interior decoration of the buildings should be under a competent woman and the landscaping around the buildings should be given due consideration.

#### CAMP GARDEN

One of the most important requirements for a successful life on a subsistence homestead is knowledge of gardening and small farm operations. To fit men for such a life it is important that each camp where conditions permit should have its garden and that the operation of this garden should be an approved work project under efficient leadership. The garden might of course be extended to include the raising of small fruits, chickens, pigs and other small farm operations. Through such means the camp table could be supplied with fresh vegetables in season and it might be possible to include canning as supplementing the garden project.

Truck repairing will be increasingly important as the trucks wear out. Well equipped machine shops should be established at centrally located camps where trucks and other heavy equipment could be repaired by the enrollees under competent supervision.

Under such a system as outlined above the emphasis would be placed upon training the men for life rather than upon temporary relief or upon immediate work



accomplishment. The latter objective could, however, be attained even better than it is being attained at present by increasing the personal responsibility and interest of the men. Instead of working the men in large gangs as at present it should be possible, through the selection of good leaders and sub-bosses, to work them in small groups making each group responsible for a given area. In the management of a forest all of the various operations on one block or compartment might be placed under one group so that these men could get an entire picture of the various forestry operations and would take a personal pride in the development of their section of the forest.

The selection of the supervisory personnel should be based entirely upon fitness for the position regardless of political affiliations. The present method of selecting non-technical men through political advisers is at best cumbersome and causes unnecessary delays. It may become dangerous to the success of the entire movement.

Under the present set-up the state forester is allowed considerable leeway in the selection of supervisory personnel and in the salaries paid, being limited chiefly by the total amount of money allotted.

A similar arrangement should exist in the purchase of equipment.

#### RURAL COMMUNITIES TO BENEFIT FROM SELECTED YOUNG SETTLERS

Many of our rural communities could be built up with a fine type of young manhood by some method of establishing subsistence homesteads for men who had completed three years' work in the camps under a system like that described above. Any program of acquisition of public forests in the future could be based upon the assumption that the improvement and development of these tracts would be done by the camps or by men who have graduated from them and reside near the forests, and the better farm lands acquired could well be set aside for such forest workers' homes. The homes for these workers could be built by these men with lumber and stone furnished from the forests under some form of coöperative agreement requiring repayment in labor for actual cost over a period of years. These men should prove valuable agents in bringing about a better understanding of forestry methods among the private owners of their community, since they themselves would have become forestry-minded.

## FORESTERS, THE ARMY, AND THE C.C.C.

BY JOHN D. GUTHRIE

*General Inspector, ECW*

THE Civilian Conservation Corps offered American foresters the biggest opportunity in the history of the profession. It gave them a chance to advance from 10 to 20 years the cause and practice of forestry in the United States. The idea originated however outside the profession and came to it unsolicited—and the significant thing was that the foresters were hardly ready for it.

The profession throughout its relatively brief existence has had to fight and scheme and lobby each year for its pennies, which in time made foresters thrifty in the spending, even to the point of niggardliness. There was so much to be done with so little money to do it with that many of its members came to the point, in physical things at least, of being content with work that was both cheap and temporary. As a natural corollary, in time foresters were accused, with justification, of having an inferiority complex. They were called "the plodding foresters,"<sup>1</sup> and it was said of them that they had become "dulled by long struggle and professional adversity." It was also said with truth that "hard work alone never wins a proper reward," and of the foresters that "their good work alone will not establish them."

With this pinch-beck background and its consequent state of mind, they were handed within a few short months 250,000 young workers to use in the forests under the Emergency Conservation Works Act of March 31, 1933. This came to be a great experiment in coöperation, for

here were four federal departments—War, Agriculture, Interior, and Labor—which must not only work together, but must work also with state forestry, park, and college (in soil erosion) agencies—all in a common cause. Labor's job was the routine of handling unemployed lists and enrollment, Agriculture and Interior had to plan and oversee and carry out the work, in close coöperation with War, which was solely responsible for the housing, feeding, morale, medical service, discipline, and supply of these youths and their 1,500 camps. Thus the Army bore the brunt of the battle.

This C.C.C. was a totally new idea—the rebuilding mentally, physically, and spiritually, of 250,000 discouraged young men through work in the forests and parks and gullied fields of the United States. They were not to be considered as ordinary laborers, the camps were not just labor or construction camps, from whom so many hours of efficient work could be expected each day. As the President picturesquely expressed it—the idea was to build men as well as trees.

## SOME ADMINISTRATIVE DIFFICULTIES

Did the foresters display any great amount of imagination or social vision in undertaking this great human experiment? It must be confessed that they did not, but rather they evidenced, certainly during the first six months, considerable fret and prieve because work results were far below what they would have expected from ordinary labor. During later

<sup>1</sup>Milwaukee Journal Editorial.



months of the experiment, the civilians became more reconciled to the quantity and quality of C.C.C. work.

Here was what amounted to free labor—in numbers beyond their wildest dreams, and after the first month in camp, the foresters apparently expected these boys to be hitting the ball like seasoned laborers—and they weren't. But worst of all, the Army was holding back from 50 to 100 men each day to "doll up" the camps, as the fretting foresters said. The Army held these camps to be the *homes* of these boys for six months at least, and following their well-known practice, proposed to make the camps and their surroundings as sanitary, as comfortable, and as attractive as it was possible with the men and the funds available. And in so doing the boys were learning lessons in cleanliness, orderliness, and attractiveness of home surroundings, which lessons will be with them always. Too few foresters saw this side and most of them were worrying and fretting because they did not have 200 men on the forest or park job six hours a day for five days a week. Their apparent interest in the C.C.C. was largely in the amount of work the boys could turn out, and not in their rehabilitation. And this camp overhead, along with extra work-shifts, side-camps, lunches on the job, use of civilian trucks for "recreation" trips, camp food, and quarters for foremen,—all came in for much discussion, correspondence and conference.

Sometimes the Army officers were arbitrary in their decisions, sometimes the foresters were unreasonable in their requests. Sometimes it appeared that the foresters were bent on trying to reorganize the Army, to "reform" it to the foresters' point of view; this was seldom successful. The game was new to everyone, and naturally the rules had to be made as the play went along,—and there

was some backing and filling.

#### ORGANIZATION UNUSUAL

Theoretically and on paper, the C.C.C. organization was logical; the Camp Commander was to have charge of everything in the camps and the Camp or Project Superintendent of everything on the work. On the ground there was no such clear-cut line, nor could there be in this dual responsibility set-up. An enrollee might loaf on the job, might refuse to work. All that the Project Superintendent could do about it was to send the man to the Camp Commander, who might merely scold the boy, fine him (not over \$3), give him a "D.D." (dishonorable discharge), or do nothing at all about it. The Superintendent might want to establish a side or spur camp to expedite the work. This meant prior approval by the Camp Commander, for the Army's responsibility to shelter, feed and care for the enrollees extended wherever they might be.

On the other hand the Camp Commander might wish to send the boys into town some night to a movie, or to an intercamp baseball game on some Saturday. The Army having only two trucks per camp, would have to depend on the Project Superintendent to lend some of his 8-10 civilian or work trucks to haul the boys. There is this constant give-and-take, this daily coöperation necessary between the Camp Commander and the Project Superintendent and if these two men had not early established a feeling of mutual respect, consideration, dependence, and official courtesy,—well, it was just too bad. The Liaison Officer at Corps Area Headquarters would be written—and expected to tell the Corps Area Commanding General himself about it, and the C. G. would be expected to write or wire the Camp Commander to do just what the Superintendent wanted. How-

ever, this was seldom the final action taken in such cases.

### A DIFFICULT JOB

The foresters too seldom realized that the C.C.C. job was a more different and more difficult job for the Army officers than any they had ever had; they had to run the camps, keep up morale, enforce discipline, not with the Army regulations back of them, but largely through their own personality and force of character; also, that the Army had pretty definite ideas on running camps and more definite ideas on organization. Now whether such ideas were right or wrong (mostly wrong in the opinion of some foresters), the Army as a going organization, as a unit of our Government, has been doing business since before 1776; also that they belonged to a profession, the profession of arms, which goes back pretty far into recorded history. So, for practical purposes, it hardly seemed worth while for the foresters to try to reorganize the Army!

A saner view seemed to be to try to learn a little about the Army's system of organization, its point of view, its way of doing business, its practices, and its customs; with this knowledge and understanding, it was more likely that the foresters' relations with the Army might be smoother. And then besides, it always seemed to me that the foresters might in a way consider the Army as their guests, since most of them were on a national forest, or in a national park, or a state forest, for the first time, and were not supposed to know all about our ways, our rules, and our customs.

Now no one, on either side, will admit that this dual authority in C.C.C. camps was ideal,—far from it; it was not the system either the civilians or the Army would have picked. But it was the system laid down by the Big Boss and it was

the one under which the C.C.C. had to be run. So, the sensible move seemed to be to make the best of it, be a good sport, and carry on.

### ALL "FORESTERS"

The civilian work overhead in the C.C.C. camps was called by several names, such as "camp superintendent" (later changed to "project superintendent"), "supervisory personnel," "facilitating personnel," or "technicians." These terms were awkward if not confusing for everyday use, so the Army early in the game lumped all these designations under the generic term "Foresters." And so "foresters" they became, whether a forester Ph.D. from Yale, a M. E. from M. I. T., a cowpuncher, a logging boss, a road foreman, a powder-monkey, or a plain rough-neck; also whether in a state or federal forest camp, or in a national or state park camp, or in an erosion camp in the middle of North Dakota. From the standpoint of the profession of forestry it is indeed unfortunate that this popular nomenclature has come into use; it has not helped the standing of the forestry profession.

### ARE FORESTERS NOW UNIFORM-CONSCIOUS?

From over 125 federal and state camps I have seen in 12 different states in 65 different national forest regions, I should say they are fast becoming so. Some have reached a much more advanced stage than others.

Through daily contacts for over a year with Army officers always uniformed, it was but natural that the foresters would eventually begin to think about their clothes, that is if they had any interest whatever in their personal appearance. The uniform-urge, however, seems to have come from the higher-ups, not from the foresters in the C.C.C. camps. I know



of one state where its "foresters" early in the game were instructed by the state forester to buy forestry-green uniforms, black Sam Browne belts, Stetsons, and boots, and for the superintendents to wear two bars on their shoulders, and foremen to wear one bar! This was an acute stage of uniform-consciousness (later the belts and bars were laid aside). In a good many states one will see the superintendents and foremen very neatly and uniformly dressed, with special ECW and state insigna on their coat and shirt collars; in others the foremen, I am frank in saying, wear no pretense of a uniform and dress like rough-necks. In the states seen I am also frank in saying that the foremen at state forest camps are universally much better uniformed than at federal forest camps. Here again I quote from my text,—the Milwaukee Journal editorial:

"Specifically, the Army is not going to be impressed (nor for that matter, the public) by groups of young foresters rigged out in nondescript khakies and proud of their disheveled appearance. It is not going to be impressed by men careless of their personal appearance or by superior officers in a service that will permit it." Argumentative foresters will say right here—"Oh, well, the Army officers have nothing to do but sit around camp and look pretty, while we have to be out on the job doing a lot of dirty work." I admit the justice of a part of the argument, but a shave and an occasional haircut doesn't look bad in the woods, and one *can* dress so as not to be confused with the enrollees. There is still an idea current in some circles that to be a forester a man must dress (and act) like a rough-neck or live like one.

#### ARE FORESTERS BECOMING CLASS-CONSCIOUS?

It has been many times said that Army

officers are class-conscious. Perhaps they are; if they are, the history, backgrounds, customs, and traditions of the Army give them a right to be. Unquestionably they are proud of their profession, of the Army, and of the Army uniform. Perhaps they are also rank-conscious, among themselves. Foresters living and eating with the Army officers now for almost two years perhaps have acquired a touch of class-consciousness.

The rule laid down by the Army early in the game was that so far as they were concerned the camp superintendent had an Army officer status, and the foremen were to be considered as non-commissioned officers, that is, sergeants and corporals. As a Chief of Staff said to me—"That's our idea about it, we may be wrong, but no one has ever told us differently."

One finds many examples of a dawning class-consciousness among foresters and also engineers in the C.C.C. camps. The expressed (sometimes vehemently) opinion that the foresters were "just as good as the Army officers" would lead one to the above conclusion. This comparison usually arose over questions of quarters or mess where the foremen or "foresters" thought they were entitled to exactly the same type of living quarters which the Army officers had, not realizing or knowing that in many cases where the Army officers had better quarters, the extra comforts and conveniences were paid for by them personally.

I have heard the argument used that because a forester-foreman had a college degree that that fact *per se* made him "just as good" as the Reserve Captain Camp Commander who in private life might have been a garage operator. Obviously, the background or prior civil occupation of neither the C.C. nor the forester-foreman has little to do with their present status in a C.C.C. camp. The

C.C. temporarily holds the rank and wears the uniform of a Captain in the U. S. Army and is moreover Commanding Officer of the Camp, and the forester-foreman holds a foreman's job. Moreover, there are many holders of college degrees among the enrollees themselves. Are they thereby entitled to better quarters and a separate mess room?

Down through the ages the act of eating together has meant a recognition of social equality, and it was but natural it should arise in the C.C.C. camps, just as it came up during the World War in our democratic army, just as it has in all wars. Some misunderstanding and perhaps some heart-burn might have been avoided had the foresters known or recognized an old Army mess custom. It is this—that the officer of highest rank in any camp is the head or president of the mess and with that position goes certain prerogatives, the most important of which is that this ranking officer has the privilege of inviting anyone or no one to mess or eat with him or at his table. In Army practice therefore to be thus invited is a privilege and not a right; just as on ship-board it is a privilege and an honor to be invited to sit at the Captain's table. And here I quote again from the Editor of the Milwaukee Journal:

"They (the foresters) have got to get over their inferiority complex and they have got to do it competently and gracefully. . . . A social status never is gained by demanding it—at least not in words. It is gained first by deserving it and next by demanding it—at least not in words. hooley into our daily attitudes."

#### ABOUT THE WORK

There has been a failure in many cases to realize that recreation development had a real place in forest work under the C.C.C., or the unprecedented opportunity given to foresters to carry out modern,

broad-gauged recreation plans under ECW; any plans followed were too often those made for an earlier and skimpier regime. Forest recreation is a perfectly legitimate part of forestry and this must be recognized by foresters or else the public will turn the forest properties over to others who will try to meet public needs and demands for outdoor recreation. Unfortunately in many cases the recreation improvements carried out by the foresters have been of rather cheap type, temporary in appearance, and in too many instances superficial in character; this also applies to some of the road or truck trail work. I wonder if when this big C.C.C. show is over whether the public (who pays the bill) will not be much more interested in the quality and permanency of the job we've done than what it cost?

Forest recreation is thoroughly "sold" to the American people; forestry is not. Realizing this fact, foresters who have imagination and vision are now carrying out well-planned, modernized, permanent developments to permit the general public to enjoy more fully the people's forests; and incidentally, these foresters are thereby building up public support for forests and forestry.

The criticism has been made of the foresters that because this was human rehabilitation through conservation work a greater variety of jobs should have been given the C.C.C. boys—more timber work, more tree planting, more cultural work, more stand improvement, more recreation developments, more fish and game, more stream improvement, and less miles of road work with its humdrum picks and shovels. Someone has remarked of the final outcome of the C.C.C. "that it will have turned out the finest bunch of pick and shovel experts the United States has ever seen!"

And this leads me to say a word or so



on the C.C.C. educational efforts. Before C.C.C. education was formalized last spring, there had been some splendid educational work done by the foresters in many camps; in others however, nothing whatever had been done. Recent criticisms I have heard are that now it runs too much toward white-collar or class-room education and too little towards the practical or vocational, in other words, that C.C.C. education should be tied in very directly and closely with the boys' daily work, to turn their attention back to the soil its products of tree, shrub, and plant, game, fish, and scenery.

#### LESSONS FROM THE ARMY

The Army has taken the leading part in the C.C.C. movement from the beginning. My own strong conviction is that absolutely no other government agency could possibly have done the job which the Army has done in the C.C.C., for the good reason that no other federal agency was prepared. I know that this conviction was not shared in by some civilians during the first year, but there has been some change of feeling towards Army administration in recent months.

No one knows now whether the C.C.C. will continue after March 31, 1935, or if so, whether it will be radically reorganized, or whether the Army will continue in it. We know this, that if the President wants the Army to carry on, it will do so, regardless of its own ideas or wishes.

As was said previously, the profession of arms is an ancient one; forestry in America is young. There are some things which the forestry profession could well copy from the profession of arms, or the Army. To mention a few: there is pride in their profession and their service, and pride in their personal appearance; loyalty to their profession and service and its ideals; loyalty to the members of the profession, and a willingness to stand up

for them against all odds as against an outsider (if an outsider makes a charge against an Army officer, the outsider must *prove* his charge or retract it).

Some civilians are still too critical of the Army and hold too narrow or provincial views on the C.C.C. set-up.

There is need for a more realistic attitude that the C.C.C. game must be played under the rules laid down; there is need for more sportsmanship.

There is in some cases still a strong tendency for civilians to assume responsibilities solely the Army's; let's redeem our own responsibilities first.

There are more complaints from foresters about the camp food than any other one thing; it all goes back to the cooks, the biggest problem the Army has—how to get a first-class cook for a maximum of \$45 per month—many civilians maintain it can't be done.

There is need for more coöperation, mutual understanding, and friendship between the civilian agencies and the Army officers.

In many camps the supervisory personnel is neatly uniformed and present at all times a good appearance; in other camps and states there is a marked need for some kind of uniform clothes for a better and neater personal appearance.

#### HOW THE ARMY HAS BENEFITED

Not being authorized to speak officially for the Army, yet I can say that the C.C.C. has been likewise a great experiment for Army officers. It has been probably the most unusual experience the Army has ever had, in that it called for working closely day by day with several civilian federal departments and some state agency in each of the 48 states, with having the responsibility of caring for some 350,000 men in decentralized camps for the most part isolated, and being deprived of the good old Army regula-

tions to work by and with! In fact, a brand new set of War Department C.C.C. Regulations had to be drawn up, to fit the unusual situations.

I shall not here go into the magnitude of the original enrolling, examination, movement of men, or housing and feeding of what amounted in W. D. terms to some 17 army divisions, or the dispatch with which these jobs were done.

First, the C.C.C. has popularized the Army as an efficient branch of the Government, and has shown that it can prove itself of immense national value in peace as well as in war; the C.C.C. gave the Army invaluable experience in big mobilization. It has also popularized the Army officer, especially in the smaller cities, towns and in rural communities.

As to the individual officer in charge of a C.C.C. camp, whether Regular or Reserve, he has gained invaluable experience in administration, supply, morale, camp construction, discipline, medical service, education, recreation, and besides—experience in having to cooperate closely with representatives of several other departments, both federal and state, and also with the general public. A camp commander was, in brief, the C. O. of a small Army Post, with all the various responsibilities and difficulties of post life. In addition to all his other duties, he was trying to make a *home* for 200 boys. And many an unemployed Reserve officer has been helped tremendously by being called to duty in these C.C.C. camps for 6 to 8 months, or a year.

Undoubtedly the C.C.C. has broadened the point of view of Army officers who have been connected with it, and given them perhaps a better idea of the work, problems, ideals, and personnel of other federal and state departments.

#### LET'S BE REALISTIC

About our own profession, our pride

in it and loyalty for it, let's be realistic for a moment.

Of over 4000 foresters and others eligible for membership in the Society of American Foresters, there are only some 2100 members. Too many members still feel that about all they get out of the Society is the JOURNAL; and some don't like the JOURNAL!

The American Forestry Association dates back to 1875 as the pioneer fighter for forestry and conservation in the United States. The Association and its officers yearly wage a fight for forestry as well as for every forester in the United States, and yet less than 10 per cent of its members are foresters. The Association has been strongly supporting the C.C.C. from the beginning, and yet its magazine "American Forests" is found in only some 900 of the 1500 C.C.C. camps. The Association last spring published a book of C.C.C. stories but few foresters bought copies; then later it published a volume of forest ranger stories that is even less supported.

#### A CHALLENGE

These times are a challenge to foresters individually and to the profession. So long have we had our noses to the grindstone, so long have we been forced to skimp, to cut corners, and economize that the keen edge of our vision has become dulled. Perhaps our standards have become cheapened and outworn, perhaps also our ideals have suffered.

Maybe because of all this we *have* acquired an inferiority complex. If during and because of the C.C.C. we do not rid ourselves of this incubus, if we do not recapture the imagination, vision, courage, and driving force American foresters once had, then—there will be no profession of forestry,—we shall be merely workers in the forests!



## THE CIVILIAN CONSERVATION CORPS AND THE NATURAL RESOURCES BOARD

BY ARTHUR C. RINGLAND

*United States Forest Service*

IT IS but a question of time and of opinion—making men seizing historic opportunities when the youthful population would be organized to form for a certain number of years a part of the army enlisted against nature—to get the childishness knocked out of them, and to come back into society with healthier sympathies and sobered ideas,—and numerous other goods to the commonwealth would follow.”—*William James.*

Two years experience with the Civilian Conservation Corps as a major agent of the Administration's emergency program, and President Roosevelt's opinion-making declaration that “this work must go on” justifies James' prophetic essay on the moral equivalent of war. There is every reason to assume that Congress, reflecting popular approval, will authorize the continuance of this extraordinary army.

In the spring of 1933 when war was suddenly declared against the forces of depression William Jennings Bryan's classic pronouncement on national defense became literally true. Several hundred thousand men sprang to their shovels overnight; the C.C.C. was mobilized; the enemy was instantly engaged on a nationwide front and in more than fifteen hundred sectors! There was, however, no von Moltke, who, when awakened and informed of the declaration of war, directed attention to the plan of campaign in his desk drawer, and complacently returned to his slumber. A staff had to be created and plans hastily drawn while the army was mobilized and even engaged with the enemy. We were unprepared for the adversities of peace!

The acute national social distress which brought into action this hastily drafted army known as the C.C.C. is slowly passing, but the economic objectives are yet to be attained. This is a stupendous task of infinite years and indefinite costs for Secretary Wallace has emphasized that America's record of land misuse is almost without parallel. If our basic heritage is to maintain our civilization there must be a unified and consistent land policy.

A unified and consistent land policy envisages, one may conclude, a new pattern of American rural life and with it the socio-economic stabilization of the population through the sustained, rather than the fugitive use, of the natural products of the soil. Obviously the accomplishment of this Herculean task demands, in its socio-geographic aspects alone in a country as vast as this, the most selective planning and the intelligent application of the available manpower for effective execution.

“First things first!” And what are these “first things” in the development of a unified and consistent land policy? Simply the selection of particular areas where demographic, economic and social evaluation justify priority of operations; where too, there is expectation that within definite physical compass *integral* measures of conservation, reclamation, improvement and rural rehabilitation can be capitalized within a reasonable period.

There is here recognition of the fact that our population is reaching stabilization in numbers. Nevertheless, because of maladjustment incident to pioneer growth, it has not attained the general standard of social satisfactions which this

country of nearly two billion acres of varied natural resources should afford. Too, there are substantial areas whose development must be deferred in the interest of the Nation as a whole. Effort must be concentrated on selected regions offering early promise of realistic contribution to the social welfare.

Under this concept competent authority should classify and select, after joint field examinations by foresters, agronomists and engineers, a series of economic and social entities or conservancies, without regard to political boundaries, embracing both public and private lands, and where in the public interest integral measures of land development of whatever character are desirable. For each conservancy a working plan should be drawn as the basis for the selection of specific work projects (C.C.C. camps) all of which should serve an integral purpose. Upon completion of the work protection forests, drainage and soil control areas, which serve the interests of all, should be declared and maintained as projects of public utility.

The advantages of such a basic framework within which a unified and consistent land policy can be executed are multiplied. For one thing the natural tendency of the numerous conservation agencies to act independently, and for local interests to think only of their own advantage, would be properly and effectively broken down. The layman and workers too would acquire an intelligent interest in the ultimate objectives to be attained if there were established, let us say, a "Piedmont Conservancy" as one of a number comprising a national land plan. Unrelated work projects, however numerous, do not give this picture. Moreover the interests of economy will be effectively served for diffused efforts however worthy in itself will be avoided. This is of the utmost importance in view

of the great expenditures involved in the fruition of any national land plan.

In principle this is the policy followed so successfully in Italy where there is in execution the most comprehensive and integral national plan of land utilization in the world.

The recent establishment of the Natural Resources Board and the fair prospect that the Civilian Conservation Corps will become a permanent national institution, for the first time makes possible a realistic approach to the execution of such an integral policy of land utilization. It is the function of the Natural Resources Board to prepare and present to the President *a program and plan of procedure* dealing with the physical, social, governmental and economic aspects of public policies for the development and use of land, water, and other natural resources. The program and plan shall include the coördination of projects of federal, state and local governments, and the proper division of responsibility and the fair division of costs among the several governmental authorities. It is the primary purpose of the Civilian Conservation Corps, as declared by Congress, to restore the country's depleted natural resources and to provide for the advancement of an orderly program of useful public works.

Here, in these two federal agencies, are found a common purpose and a common problem. Sound organization dictates that the program and plan of procedure which the Natural Resources Board is enjoined to report to the President shall include provision for the full use of the Civilian Conservation Corps as one of the major agencies in the execution of their plans. For the Natural Resources Board may be likened to the War Plans Division of the General Staff of our Army which is charged, in general, with the formulation and coördination of plans



for the disposition and use of the various arms of the military forces in possible theatres of war. The C.C.C. is analogous in its strength to the military forces and is the man-power available for the execution of the plans. The NRB and the C.C.C. are interdependent and provide the indispensable elements of a purposeful organization for the execution of a unified and consistent land policy.

Our political set-up of many federal conservation bureaus and state agencies has hitherto made impossible an integral attack to meet a common national problem. Under the suggested plan the Civilian Conservation Corps becomes in all respects a national service agency. The Corps, by the allocation of its man-power as auxiliary units, can weld together through the Natural Resources Board, and regardless of departmental separatism, the common objectives of the various conservation agencies federal and state, and to a definite purpose.

Foresters have been clamoring for "leadership" but they have too often failed to recognize that an American forest policy, in terms of direct human values, has been, in the large, an ideology. This could hardly be otherwise in the making of a pioneer country with an economy motivated by the philosophy of exploitation. While the price has been high it is the depression and its influences, and not the effects of propaganda, that have created such remarkable instruments as the C.C.C. and the Lumber Code;

that too, have brought home to the layman the need for realism in conservation. The ears are cocked when the belly is empty!

Our forestry propaganda too often misses fire. It avails little to the lay mind to preach, for example, the necessity for the public acquisition and development of so many millions of acres of forest land. Constructive action demands focus upon specific regions—not the mere definition of purchase units known only to officialdom, but the public declaration of defined socio-geographic areas such as the Ohio Valley watershed. It may be ventured that the necessities of the public interest in the protection of the great Appalachian Range, cutting across the most intensively developed sections of our country, would have been immeasurably advanced had our propaganda been focused upon definite objectives; based too upon precise and published plans developed through federal-state coöperation and with the support of opinion-making local bodies. This opportunity to promote public opinion to a purpose is still to be capitalized.

A historic opportunity is now within the grasp of the profession precipitated by the march of events beyond our shaping. We can, however, contribute to the shaping of future events, and energize forestry into a positive vital force in the development of a socio-economic undertaking without precedent. Let us seize the tools which historic opportunity has forged!

## THE SHELTERBELT PROJECT

Ever since the first announcement of this hitherto unparalleled undertaking in afforestation on a national scale discussion pro and con its feasibility has been active in the profession. President Chapman's editorial comment, and Ellsworth Huntington's article in the November JOURNAL have served apparently to stimulate intelligent and intelligible expression of the opposing points-of-view. The proposition is of such magnitude, of such enormous importance to the nation and of such deep significance to the profession of forestry, as to justify devoting to it a comparable amount of space in our professional magazine. We are fortunate, therefore, in being able to present herewith; first, a digest by Chapman of the numerous individual opinions on which he based his November editorial; second, reproduction in full of 18 of these letters which seem to be of particular interest; third, articles by William L. Hall and R. S. Kellogg, two members of the Society of long standing who were born and raised in the shelterbelt region and in the early years of this century had much to do in planning and executing tree planting projects in it; and finally, an official and thorough account of the shelterbelt project by C. G. Bates a prominent member of the project's technical advisory staff.

### DIGEST OF OPINIONS RECEIVED ON THE SHELTERBELT PROJECT

By H. H. CHAPMAN

*President, Society of American Foresters*

**S**OON after the first announcement of the shelterbelt project, with its accompanying publicity, several members of the Society expressed to me their skepticism of the project, and expressed the desire that the Society undertake an investigation for the purpose of safeguarding the profession against possible future criticism. As an example of these opinions, the letter of Professor Fay G. Clark, School of Forestry, University of Montana, is offered:

Missoula, Montana, August 18, 1934.

"I do not know how much or how little you may know about this large shelterbelt project of one hundred miles wide and fifteen hundred miles long that the Forest Service advocates planting down through the prairie states. During the last year or so I have traveled through northeastern Montana and western North and South Dakota, and practically all of the shelterbelts and woodlots that have been established during the past thirty years in this section are dead from lack

of water. In addition to this, it has proved to be exceedingly difficult, as you no doubt know, to establish shelterbelts on any but the most favorable sites. I can not see how the Forest Service can hope to foster a project which seems to me to be doomed to failure before it is started.

"What concerns me the most is the fact that if we, as a profession, advocate or sponsor such a project, and then it fails, it is going to shake the public confidence in our professional integrity. To me it looks like merely a political pork barrel scheme, out of which no good can come. I do not know whether you will agree with me on this or not, but if you do, I think the matter should be placed before the Society for an expression of opinion, to determine whether or not, as a Society, we wish to sponsor such a thing as is being advocated. I have not as yet talked with a single forester who is familiar with the conditions in this particular region who has not been of the same opin-



ion as myself. I fear that if the project goes through as is being advocated, it is going to discredit not only the Forest Service, who no doubt will handle it, but the entire profession as well.

"For some thirty years the lumbermen have thought of the professional foresters as a lot of rattle-brained theorists, and we are just now beginning to disabuse them of this opinion and to secure their confidence. And now, are we going to lose the ground we have thus gained by sponsoring, or perhaps I should say condoning, a project of this magnitude that most of us feel is doomed to failure? The least that can be done is a careful investigation of the situation and, at least until the facts are known, stopping the newspaper publicity on this matter. I can not understand why the Chief Forester permits such a riot of publicity on the proposed project until he is assured that the project could be completed with a fair degree of success.

"In addition, the public should be told the truth about the effect of forests on climate and stream flow. Some of the statements I have seen have been utterly absurd, and with very little regard for the scientific truth."

F. G. CLARK.

In response to this sentiment, the following form letter was sent to 44 men, who by their position as scientists or foresters and experience within the proposed shelterbelt area were capable of both sound and independent judgment on the questions involved. No previous knowledge was had of their opinions. Replies were received from 31 of these men. The letter follows:

"The announcement of the President's western tree planting program about a month ago, has, by reason of its scope, the publicity it has received, and the very serious questions raised as to its probable success, caused widespread apprehension

among professional foresters both within and without the region affected. Quiescent acceptance of this project without questioning either its technical soundness or its administrative efficiency might damage the reputation of foresters and forestry for decades.

"The primary question is whether trees planted in continuous belts one mile apart and 1000 miles long in the region chosen will survive, given cultivation and such care as is practical. If this could be answered in the affirmative, attention could be paid to claims as to effects on climate and local environment. As a forester or scientist familiar with tree planting in this general region, could you supply the Society with facts from your experience regarding the probability of survival of such plantings, in ordinary years and in drouth years, and your opinion as to the feasibility of the project."

H. H. CHAPMAN.

Practically all of the replies received contain information valuable to the Society and to the Forest Service. Due to lack of space an effort has been made to digest the opinions presented.

Those contributing to this discussion are:

Blackwell, C. P., Dean, Oklahoma Agric. and Mechanical College, and Director Agric. Experiment Station, Stillwater, Okla.

Cheyney, E. G., Professor of Forestry, College of Agriculture, Forestry and Home Economics, St. Paul, Minn.

Clark, Fay G., Professor of Forestry, University of Montana, Missoula, Mont.

Cobb, F. E., State Forester, Bottineau, North Dakota.

Cooper, William S., Professor, Department of Botany, University of Minnesota, Minneapolis, Minn.

Edmondson, W. O., Extension Forester and Horticulturist, Laramie, Wyoming.

Fetherolf, James M., Kempton, Pa.,

formerly with U. S. Forest Service in forest extension.

Fritz, Emanuel, Professor of Forestry, University of California, Berkeley, Calif.

Gates, F. C., Professor of Taxonomy and Ecology, Department of Botany and Plant Pathology, Kansas State Agricultural College, Manhattan, Kansas.

Hall, W. L., Consulting Forester, Little Rock, Ark.

Hancin, John, Botanist and Collector, 114½ S. Fifth Street, Salina, Kansas.

Hanson, Herbert C., Head, Department of Botany, Agricultural Experiment Station, North Dakota Agricultural College, Fargo, N. Dak.

Hill, C. L., Research Assistant, Dept. of Forestry, University of California, Berkeley, Calif.

Huntington, Ellsworth, Research Associate in Geography, Yale University, New Haven, Conn.

Johnson, Fred R., Assistant Lands and Public Relations, Region 1, U. S. Forest Service, Denver, Col.

Karper, R. E., Vice Director, Texas Agric. Experiment Station, College Station, Texas.

Keating, Mrs. W. R., De Sinet, So. Dak.

Kittredge, Joseph, Jr., Professor of Forestry, University of California, Berkeley, Calif.

Metcalf, Woodbridge, Extension Forester, Berkeley, Calif.

Miller, W. L. Professor of Botany, Division of General Science, South Dakota State College, Brookings, S. Dak.

Mulford, Walter, Professor of Forestry, Dept. of Forestry, University of California, Berkeley, Calif.

Parker, Rutledge, State Forester, Missoula, Montana.

Phillips, George R., State Forester, Oklahoma City, Okla.

Pool, Raymond J., Professor of Botany, University of Nebraska, Lincoln, Neb.

Ramaley, Francis, Head of Biology Department, University of Colorado, Boulder, Colo.

Ross, Norman M., Superintendent, Forest Nursery Station, Indian Head, Saskatchewan.

Schmitz, Henry, Director, Department of Forestry, College of Agriculture, Forestry and Home Economics, St. Paul, Minnesota.

Sears, Paul B., Professor of Botany, University of Oklahoma, Norman, Okla.

Siecke, E. O., State Forester, College Station, Texas.

Thompson, Paul K., Supt. State Experiment Farm, Gillette, Wyo.

Towle, R. S., Supt., Sheridan Experiment Farm, Bureau of Plant Industry, U. S. Dept. Agriculture, Sheridan, Wyo.

Visher, S. S., Associate Professor of Geography, Indiana University, Bloomington, Ind.

Watkins, Clayton W., Extension Forester, College of Agriculture, Lincoln, Nebraska.

The following persons contributed letters to the American Forestry Association which were published in *American Forests*, November, 1934, but are not included in this digest:

Blackwell, C. P., Dean and Director, Oklahoma Agric. and Mechanical College, Stillwater, Okla.

Burr, W. W., Dean, University of Nebraska, Lincoln, Neb.

Conner, A. R., Director, Texas Agric. Experiment Station, Agric. and Mechanical College, College Station, Texas.

Graves, Henry S., Dean, Yale School of Forestry, New Haven, Conn.

Sandsten, E. P., Dean, Agric. Experiment Station, State Agricultural College, Fort Collins, Col.

Scott, Charles A., Secretary, Kansas Horticultural Society, 222 South Street, Manhattan, Kansas.

Waldron, C. B., Professor, Department



of Horticulture and Forestry, North Dakota Agricultural College, Fargo, N. Dak.

Will, George F., Nurseryman, Bismarck, N. D.

Wilson, Robert, formerly in charge of tree planting investigations, U. S. Bureau of Plant Industry, Mandan, S. Dak. (San Fernando, Calif.)

1. Unqualified approval of the project as originally announced by the U. S. Forest Service. None.

2. Confidence that trees can be made to grow within the area if given proper care, and indicating the conditions and technique required.

Edmondson, Wyoming; Watkins, Nebraska; Towle, Wyoming; Johnson, Colorado; Thompson, Wyoming; Ross, Saskatchewan; Kittredge, California; Phillips, Oklahoma; Siecke, Texas; Cobb, North Dakota.

3. Belief that climatic factors would not be influenced on a large scale by the proposed belts one mile apart.

Cheyney, Minnesota; Parker, Montana; Cobb, North Dakota.

4. Desire that project should be preceded by thorough investigation, and co-operation with state and federal stations on which planting has been done.

Hanson, North Dakota; Sears, Oklahoma; Thompson, Wyoming; Fetherolf, Pennsylvania; Parker, Montana; Schmitz, Minnesota.

5. Fear that the project as proposed will result in waste and failure and will discredit forestry.

Hanson, North Dakota; Clark, Montana; Fritz, California.

6. Necessity for a public understanding of the attitude of scientific men in advising caution and experimental operation. Need of statement of real objectives.

Pool, Nebraska; Schmitz, Minnesota.

7. Vigorous condemnation of the project as impractical.

Gates, Kansas; Mulford, California; Karper, Texas; Fritz, California; Clark, Montana; Hancin, Kansas.

8. Testimony as to effect of drought of 1934 in killing well established plantations and windbreaks.

Keating, South Dakota; Cooper, Minnesota; Pool, Nebraska; Sears, Oklahoma.

9. Necessity for avoiding unfavorable soils and sites if plantations are to succeed at all.

Blackwell, Oklahoma; Ramaley, Colorado; Ross, Saskatchewan.

10. Emphasis on the scrubby character, slow growth, and short life of plantations in the region.

Sears, Oklahoma; Cheyney, Minnesota; Parker, Montana.

11. Advocacy of restoration of grass vegetation as a complementary measure or substitute.

Sears, Oklahoma; Metcalf, California; Fritz, California.

12. Objection to extravagant claims put out by publicity emanating from the Forest Service.

Metcalf, California; Fritz, California.

13. Data and discussion of extent of influence of windbreaks on wind velocities emphasizing need of more frequent intervals than provided.

Metcalf, California, and others.

14. Opinion that the problem is for the individual ranch rather than by large scale public agency.

Metcalf, California; Karper, Texas.

15. Need of irrigation to insure success of plantations.

Metcalf, California.

16. Skepticism of success of tree planting on the whole, within the region designated.

Metcalf, California; Visher, South Dakota.

17. Suggestion that the belt is too far west, and trees would not do well.

Visher, South Dakota; Johnson, Colorado; Cheyney, Minnesota.

18. Caution against damage by rodents, hail storms, etc.

Ross, Saskatchewan.

19. Emphasis on necessity for constant supervision and control if the project is not to be doomed to failure.

Miller, South Dakota.

20. Suggestion that hedgerows of hardy shrubs would survive better than trees.

Ramaley, Colorado.

Mr. Carlos Bates of the Lake States Forest Experiment Station had indicated his intention to supply the JOURNAL with an article on the shelterbelt project. A copy of the editorial of November, 1934, was sent him in advance. Mr. Bates wired, protesting against insinuations that appointments in the shelterbelt project might be made on a political basis. The sentence referred to was as follows: "If to this (administrative burden) is added the announced and enforced policy of the administration to require political endorsement for *all* nontechnical supervisory positions. . . ." This sentence was not directed at the shelterbelt but applied to all projects under the emergency relief funds. Request was made by me for proof of assurance that the shelterbelt project would be excepted from this rule. Other telegrams were then received, in advance of publication of the editorial, from:

Cochran, H. D., Shelterbelt project, U. S. Forest Service, Lincoln, Neb.

Phillips, George R., State Forester, Oklahoma City, Okla.

Roberts, Paul H., in charge of Shelterbelt project, U. S. Forest Service, Lincoln, Neb.

Simpson, Alva A., Shelterbelt project, U. S. Forest Service, Lincoln, Neb.

Scott, Charles A., State Forester, Kansas.

None of these men had seen the editorial previous to their protest. That of State Forester Phillips is reproduced as indicating the sincerity of this effort to secure modification of editorial expressions for fear of damaging the project:

Oklahoma City, Nov. 5, 1934.

"Am advised November JOURNAL is to editorially condemn shelterbelt project stop hope you will fully discuss this matter with interested officials and foresters resident in plains area thoroughly familiar with plans and conditions in field before aligning JOURNAL against project stop own experience growing and distributing trees and observing earlier plantings convinces me there are real opportunities for benefit and every reason to believe successful plantings can be made if proper attention given soil selection ground preparation species selection and care.

GEORGE R. PHILLIPS,

*State Forester.*

It might be well to emphasize at this time the fact that this gigantic project was launched, with its accompanying publicity, without any apparent effort to ascertain the views either of the profession of forestry or of the scientists in other branches of the national or state governments who had been experimenting for years with shelterbelts in this region, since which time the editor of the JOURNAL has been unable to obtain any statement for publication which would indicate that the proposal had been modified in form, except through curtailment of funds to \$1,000,000. Should the JOURNAL be criticised for endeavoring to correct these widespread impressions for the pro-



tection of the profession? It appears to me that this affair emphasizes anew the vital importance of preserving the in-

dependence of expression and discussion of any or all topics of professional interest, regardless of their sponsorship.

### INDIVIDUAL LETTERS RECEIVED ON SHELTERBELT PROJECT

BATES, C. G., LAKE STATES FOREST EXPERIMENT STATION, UNIVERSITY FARM, ST. PAUL, MINN.

Your letter of October 31st is received.

I want you to know that I protest most vehemently against the publication of Chapman's editorial in the November JOURNAL in the form in which submitted with your letter and without time or opportunity for the profession as a whole to discuss the project. It is all very well for Chapman to say that he has canvassed the situation and is expressing in cold blood a cross-section of the professional opinion, but one would like to know just how such a cross-section was obtained, and to what extent those who know anything, first hand, about the conditions have been consulted. If one wanted a valuable professional opinion on the feasibility of treating cancer, he would not consult lung specialists, nor would he consult general practitioners. I do not consider the opinion of the greater number of eastern foresters on this subject as of very much value.

BLACKWELL, C. P., DEAN AND DIRECTOR, OKLAHOMA AGRICULTURAL AND MECHANICAL COLLEGE, STILLWATER, OKLA.

Dr. Rolfs has referred to me your letter of September 28 making inquiry about the establishment of the shelterbelt project. We have made some study of this section of the state with reference to forestry. In fact we have had a good many trees planted during the past few years.

We have also made a good many analyses of soils and a good many observations. It is our judgment that the project has some merit if modified to meet local conditions and if plantings are made under favorable conditions first. We are certain however that much of the soil in this area will not grow any kind of timber. Some of it is too high in alkali for tree growth. Some of it is very dry. That is, the slope is steep and the soil hard clay which means water does not penetrate into it in any great depth. Tree planting on such land would be a waste of time and money.

There are certain sections, however, where trees grow rather successfully. We have some information on the species of trees which will do best and if plantings are confined to the soils which are suitable for tree growth and well adapted species used, we would predict a fair degree of success for those localities. The idea of planting on every section line with the rows running north and south would not be very desirable in the western part of this state in view of the fact that a prevailing wind from the southwest is more nearly from the south than from the west. In winter the wind is almost directly from the north. Rows of trees planted north and south would not furnish very much protection against wind erosion.

It is our hope that if the project is undertaken at all, it will be modified to meet these local conditions and if this is done, we would expect a fair degree of success.

COBB, F. E., STATE FORESTER, NORTH DAKOTA.

I have your letter of the 29th in regard to the Federal Shelterbelt Project and will give you my experience and opinion in the matter.

I have been connected with shelterbelt plantings in the Great Plains continuously since 1915, except for two years in New York. As a government employee in the Bureau of Plant Industry, Office of Dryland Agriculture, at their Field Station at Mandan, North Dakota, I was there at the beginning of their shelterbelt project. This was the planting of demonstration shelterbelts around farmsteads in North and South Dakota west of the 100th meridian, and in Wyoming and Montana to the Rocky Mountains. I have been in practically all townships which have had farming sections in this area, both as an inspector of proposed plantings and inspecting plantings for several years after being planted. From 1925 to the present time I have been President of this Junior College and State Forester, being in charge of the same work in all of North Dakota. At the U. S. Field Station at Mandan, and since for the state, I have done actual work or have been in charge of the nursery raising trees for these projects.

In answer to your question as to the technical soundness of this large federal project, I would unquestionably state that it is entirely sound and with the proper species of trees and previous preparation followed by subsequent cultivation and supervision should give a high degree of success. In normal years our success in such plantings has been about 90 per cent, that is with hardwoods. Both the U. S. Field Station at Mandan and the State Forest Nursery here make it a rule to replace first year losses the following spring only. After that time the other

trees have made such a growth that smaller replacements made are not able to compete and soon die or remain stunted.

We have also found that seed from native trees are the best. That is, seed of the same species brought in from further east or south will not stand the long, cold winters or the comparatively drier summers from where the original seed trees grew. In the northern plains we are apt to have late spring frosts or even freezes in June and July and early fall frosts or freezes in August. The native trees come back quickly from such setbacks, where the same species from trees east or south may be killed entirely. Introduced northern Asiatic trees have also proven satisfactory, coming from a similarly hard continental climate, such as Russian olive, Chinese elm and caragana (Siberian pea tree).

With the conifers the difficulties have been greater. We have tried many species and have finally settled on Black Hills and Colorado blue spruce, Western yellow pine (Black Hills, eastern Montana or western North Dakota seed) and juniper from western North Dakota or the Black Hills. Scotch pine has been used many times but while successful in some places cannot be generally used. Jack pine (*Pinus banksiana*) has not proven successful even in sandy areas. And where it has reached a size of twelve or fifteen feet is a sorry looking tree.

The size of hardwoods used has been 2-0 or one year seedlings not smaller than 18-20 inches. Poplars (a native hybrid) cottonwoods and willows when used are always rooted cuttings. These, together with caragana, are always cut back to one foot or so in length.

Conifers are either 2-3 or 3-2 stock and will average probably 8 to 10 inches. Failures of these we replace for several years in order to obtain a good stand. They are generally planted in the lee,



that is on the east side of north and south belts and on the south side of east and west belts.

Even during these last five years of drouth in North Dakota our plantings have been uniformly successful, where the land had been properly prepared the summer previous to spring planting and had received the proper subsequent cultivation. In the northern plains trees must be cultivated until the rows grow together enough to preclude such operations.

As to the effect on the climate, which means over a wide area, I would hesitate to hold out any encouragement. This summer's drouth, extending through the wooded areas of the Mississippi valley as far as Ohio, would indicate that the trees have not prevented the drouth conditions. As to local influence, this is a debated question. In our State Nursery here, consisting of approximately twenty acres almost surrounded by trees and with numerous cross hedges of trees of varying sizes, we have had dirt blowing. But no doubt when the steady northwest or southeast winds blow, which prevail in the northern plains, the surface of the ground will be less effected by the resulting evaporation with belts of trees every mile. Within the 100-mile strip farming conditions under normal rainfall and weather conditions should be improved. Outside of this strip I doubt very much that there will be a difference.

Now as to the survival of such plantings. In certain sandy loam soils there are now plantings of cottonwood and green ash surviving after thirty to fifty years, even on abandoned farms. Where the soils are heavier, tending to clay, it may be necessary to begin the renewal of such belts in twenty-five or thirty years or earlier if a long drouth condition arises again. To eastern people unfamiliar with soil conditions here it is

difficult to believe the amount of moisture that is held in the soil during short periods of drouth of from one to three months. Of course, when several years of drouth follow consecutively it is finally lost and needs several normal or above normal years of rainfall to bring it back.

We have a coöperative government weather station here. Since 1924 every year has been below the normal of 15.76 inches, except 1927 with 21 inches; 1928 with 16 inches; and 1932 with about 16.25 inches. Yet it has only been since 1929 that we have suffered real drouth. If we receive a normal amount of rain in May, June, July and August, which is our "rainy" season, we do not worry about the rest of the year. The snow when it comes late, after the ground is frozen, is practically valueless as it either evaporates directly or blows into ravines where it finally melts and runs off. When snow comes before the ground freezes then it is of value as there is very little runoff in the spring. The 100 belts will no doubt hold much snow which will not only furnish moisture for the trees themselves but benefit the adjacent fields.

On the whole, in my opinion, after living in North Dakota for nearly 20 years and working in South Dakota, Wyoming and Montana, I would say the project is not alone feasible but will result in much good.

Mr. Ernest George, Assistant Silviculturist, Northern Great Plains Field Station, Mandan, North Dakota, I am sure will be glad to give you his opinion. He is in charge of the shelterbelt project carried on from that U. S. Station in the four states of the northern plains mentioned above.

I think Mr. Fred Johnson, Chief of Planting, U. S. Forest Service, Denver, will also be glad to write you of conditions in the Central Great Plains.

You no doubt are familiar with Farm-

ers' Bulletin No. 1312, "Tree Planting in the Great Plains," which he and I wrote in 1922 and which has since been revised and reissued. I am sending a copy of this bulletin, together with copies of our State Nursery Pamphlets which will show you our requirements for such plains shelterbelts as the government is going to plant.

COCHRAN, H. D., U. S. FOREST SERVICE,  
DENVER, COLO.

Informed of proposed shelterbelt editorial. As member Society desire to protest against use of editorial space in JOURNAL to condemn any major forestry movement without previous consideration and discussion in columns. (telegram)

COOPER, WILLIAM S., DEPARTMENT OF  
BOTANY, UNIVERSITY OF MINNESOTA,  
MINNEAPOLIS, MINN.

I found your letter when I returned to Minneapolis and have since talked of the shelterbelt project with several members of our Department, not having any experience of my own to offer. Dr. Rosen-dahl and Dr. Butters have traveled in the western part of Minnesota during the past summer and have made the following observations:

As a rule the wind breaks around farm houses are entirely killed. In fact they were mostly dead before the present year, since this summer only marked the culmination of several years of severe drouth with us. In some places they report that the wind break trees were dying out three or four years ago. The trees used for this purpose in our region are mainly cottonwood and box elder. Mr. Etlar Nielsen has visited North Dakota during the past summer. He confirms the above observations and adds an interesting fact, namely, that while box elder and cotton-

wood are practically dead, green ash has survived remarkably well. Planted trees are still alive and young seedlings are thriving.

This is all the first hand information I can provide. Personally I feel that the project has very little chance of success unless they are able to find highly resistant tree species. Certainly those species which have been most commonly used as wind breaks will fail.

EDMONDSON, W. O., EXTENSION FOR-  
ESTER, STATE OF WYOMING.

I have been delayed in answering your inquiry of October 11 due to sickness.

I wish to say that my experience in Wyoming during the past six years is to the effect that trees planted on dry land and given every care, such as fencing and systematic cultivation, for a number of years, will come through in good shape. This is demonstrated by the many good farm shelterbelt plantings over the eastern part of this state. The past four dry seasons have been hard on the uncultivated plots of trees and many of these plots are showing the effects of the drought very badly.

I believe that the trees should survive in the region chosen, if they are given good care and cultivation. With three or four more dry years, however, the trees might not come through so well. Yet after the second or third year the trees collect a lot of drifting snow, and there is no question but that that condition is a great help to growing trees without irrigation.

My suggestion is that plenty of distance between rows and in the rows should be allowed to facilitate cultivation for a number of years.

GATES, F. C., PROF. OF TAXONOMY AND  
ECOLOGY, KANSAS STATE AGRICULTURAL  
COLLEGE, MANHATTAN, KANSAS.



Within the area within which it is expected to plant for a few hundred feet either side of running rivers and probably some of the larger temporary stream valleys, trees such as cottonwood, honey locust, and sometimes elm, box elder, and hackberry will grow slowly, but just as soon as the immediate valley is left, there is essentially no chance of establishing a forest growth unless water is brought to each tree and the trees are regularly cared for. Water, of course, is the most important limiting factor, but rabbits and mice would do a good deal in preventing trees from growing. In the case of farmers in this vicinity, great effort is expended in getting even a few depauperate trees around their houses. In many cases, they are scarcely able to do this unless they are very favorably located from the water standpoint. In one case towards the western part of this area, land which was homesteaded about 50 years ago, there were two years ago in a close circle 8 walnut trees 45 years old and less than 5 feet in height. This is but an ordinary sample of what would be expected, except that probably these had a good deal of care in the very early years.

In what used to be called Kansas National Forest south of the Arkansas River, an area which begins in the proposed shelterbelt, many trees were set out in the early days of Kansas History. In 1929 I spent a week in this "forest" without finding even one tree. Farther to the east my experience with attempting to establish Chinese elm as an experiment resulted as follows:

Of the literally thousands of seeds (nearly one bushel) which I planted in all sorts of situations, both in fall, winter, and spring, those which were on the prairie failed to do more than germinate and develop one or two leaves; those which were in heavily sodded prairie gen-

erally did not even germinate; those, however, that were in valleys and draws where shrubs and trees were growing germinated quite well and in a number of cases are still present as small, slow-growing treelets. Of the hundred or more that I grew in my yard to one and two-year-old stages and subsequently transplanted to the prairie, in every case those on the open prairie failed to establish. Some were eaten by rabbits and cattle, others grew to the height of the grass and dried up. Those that were in woody areas unless eaten by rabbits were present four years after planting. At that time a park was made of the area and the so-called cleaning up eliminated the trees; otherwise, I should expect to have had them pull through.

To sum up the whole situation as I see it from the part of Kansas that is planned to plant, there is no question but what planting can be done. The chance of coming through would be poor to fair in valley slopes, virtually nil on the uplands unless under direct and constant care, which probably would make the cost out of all bounds, and fair to good in the immediate vicinity of streams. Considering that the purpose is to help stop blowing, the linear extent of the streams would be much less than a tenth of one per cent of a line across the state and it would be in the place where the blowing wasn't. Furthermore, of the many tree claims which were taken out years ago, the majority had to be abandoned. A number were changed into homestead claims. Those that did make a go of it were few and far between and especially favorable as to location. Restoration of grass on the blowing areas would do much more to check blowing, but is in itself no mean task.

Once in a while one finds individual trees on the uplands, especially in the eastern part of this proposed belt. It

appears to me that this may be used to give the impression that any number of trees would grow there; whereas a better appraisal of the situation would be that of a number more which may have started, there was water enough for but one, and if that one happened to be so situated it would grow as a tree. Such trees are seldom more than 20 or 25 feet high, but of course they are very conspicuous on plains-prairie landscapes. Investigation of a number of individual cases frequently shows that the tree is really at the head of a new erosion channel where it evidently received a concentration of water, and some such cases if a group of trees are present result in shading out grass with the release of the soil to erosion, thereby defeating one of the important situations in this country.

I have been through only about a third of the most droughty part of the area that would come within this belt. The thing which amazed me most was the large number of dead willow trees along stream valleys. Such trees are usually the last ones to feel drought. Many other trees are dead, but in a hit and miss manner. As most of this area has no trees on the uplands, except around farm houses or in towns, the drought effects in the valley were very impressive.

Farther east such a belt would have a better chance, but in the area where it is proposed, I can see no chance for anything but failure for the project.

HANCIN, JOHN, SALINA, KANSAS.

Your letter on the President's tree-planting program was received some time ago. Having done a good deal of botanical collecting within the designated region and on either side in the Dakotas, Nebraska, Kansas and Colorado, and being familiar with the topography, climate and flora, I can only regard the tree-

planting project as an air-castle of a dreamer. Given care and persistent re- placement of the large percentage of trees that would surely die by drought, fire and other causes, the tree belts could probably be kept alive but without artificial watering the trees would never attain sufficient size for any practical purpose. The behavior and fate of trees in timber claims furnish ample proof. Species like cottonwood, hackberry, ash, and locust which in favorable situations grow to be 60-100 feet high or more, when planted in timber claims or around dwellings on the arid upland west of the 100th meridian seldom reach a height of 25-30 feet in 50 years. 20 feet is nearer the average and very few live to be 50 years old.

The fire risk is a thing that outside foresters are very apt to overlook. Even if the trees were given clean cultivation they would still be menaced by wind-driven weeds. After the harvesting of the crop many fields produce a rank growth of tumble-weeds; in wet years, tickle-grass; and in dry seasons, Russian thistles—which break off and roll with the wind until they come to rest against some barrier. Against these weeds a fence is no protection. The first weeds simply bank up, forming an inclined plane, and the rest go over. This trash burns like tinder and if it escapes fire it makes an ideal shelter for rodents and destructive insects. This is not a local condition. It is characteristic of the whole plains region.

The enclosed picture of timber claim was made Sept. 25, 1934 by W. C. Fuller of this city. The trees (Osage orange) located 16 miles west of Salina, were planted in 1883. This timber claim is called a success because it has yielded some fence posts and some of the trees are still alive. Of those that remain no a tree is 20 ft. high. Among the trees



the ground is hard, dry, and bare. In 50 years the trees have failed to produce a forest floor suitable for conserving moisture. With the prevailing wind, heat and aridity it is unreasonable to expect to get forest conditions from tree belts only a few rods wide and a mile apart. Timber claims of ash and honey locust in western Kansas and Nebraska have made a still more sorry showing than this Osage grove. The land office record is all that remains of many of them.

It is the consensus of opinion among farmers and plainsmen that the proposed tree belts, if planted, cannot make good and that it would be almost criminal folly to break up grasslands to try the experiment.

The timbered area in Kansas at present is much larger than it was 75 years ago but there is no evidence of increased rainfall or any other climatic change.

JOHNSON, FRED R., U. S. FOREST SERVICE, DENVER, COLO.

Your letter of October 1, together with the inquiry regarding the shelter belt project, is received.

This project, as you know, has a double purpose; first, relief to residents of the drought stricken area, and secondly, planting of trees in the belief that they may lessen the effects of future drought, reduce the amount of soil blowing and possibly have a general beneficial effect upon climatic and living conditions. The official statement on the plains shelter belt project, issued by the Lake States Forest Experiment Station and the Project Director, is very modest in any claims that are made regarding the beneficial effects of the planting.

As you probably know, for the past three or four years, the plains region has been in the midst of a dry cycle, especially with regard to winter and spring pre-

cipitation. There have been severe winds and these have caused much greater damage to the farms of this region than has been caused by water erosion. A report prepared by one of the soil men of Kansas State Agricultural College, shows that in six counties in south western Kansas an average of two inches of soil was lost from all of the cultivated fields as result of the spring winds of 1933. In many wheat and fallow fields as much as four inches of soil was lost. This soil has drifted over pasture lands, piled up against fences and shelter belts, and is a serious problem. Other agricultural experiment stations in this territory have reported the same condition and it is understood that in the spring of 1934 the dust storms from the central western farms extended to the Atlantic seaboard.

The proper species of trees planted in this territory will help a lot in controlling this condition, and these trees will survive. We have many measurements and reports in our files on shelter belts throughout the plains region, some of which have been planted for fifty years or more. I saw a very interesting tree claim east of Goodland, Kansas, which was planted about forty-five years ago. The trees were spaced 8 x 8, the grove is 200 feet wide and one-half mile long, and forest conditions prevail. Green ash was the species used.

There are some things in the statement issued by the Lake States Experiment Station with which I do not agree, based upon my experience during the past 22 years in Kansas, Nebraska, Colorado, and Wyoming. It is realized that this is a preliminary statement, that the project is being started on an experimental basis, and I am sure that consideration will be given to all factors before the work is undertaken on a large scale. I believe that the west boundary of the belt should not be farther west than the 100th merid-

ian so that the trees may benefit from the normally greater precipitation than in the territory farther west. Better growth and density approaching natural forest conditions may be expected and the belt will be of more benefit to a richer agricultural region.

If the belt is located too far west, in general, lower survivals may be expected and there are likely to be more failures from drought and grasshoppers. Trees do not grow so tall in the western plains, and there is not sufficient soil moisture to support a dense stand of trees in which forest conditions may be attained.

For example, the State Forester of Colorado advocates that the trees be planted in rows 14 feet apart with the trees 8 feet apart in the row. The Extension Forester in Nebraska recommends a spacing of 12 feet between rows, and from 4 to 8 feet in the row. Some of the State and Federal Experiment Stations in this western plains region are recommending that the rows be 16 to 24 feet apart. In my work in connection with the distribution of trees under the Clarke-McNary Law I have advocated a midway course between the 4 x 4 spacing recommended by Ross on the Canadian plains, and the wide spacing recommended by the experiment station men. When Cobb and I prepared Farmers Bulletin 1312—Tree Planting in the Great Plains Region, in 1921, we recommended a spacing of 10 x 6 or 8 x 8; but as result of the drought of the past few years I think that it will be necessary to have the rows about 12 feet apart and cultivate as long as any farm machinery can be pulled through. Some of the agricultural experiment station men say that we can never expect forest conditions in the western plains. However, I have seen some good belts of trees where the grass has been crowded out, as in the case of the green ash grove mentioned previously,

and with red cedar and ponderosa pine, but more of these may be seen east than west of the 100th meridian. These are mere details that will be worked out.

Summarizing; I am confident that trees will grow as proved by thousands of shelter belts, but their value will be local rather than extending over a large territory. However, no one can predict the cumulative effect of so much planting, and these belts will have a demonstrational value in encouraging additional planting for a considerable distance from the main belt.

There will be some discouragements and failures, but there is no question of the ultimate success of the project over a period of years. I think that the survivals will be higher than on private plantings because the project anticipates the use of only tried species and of proper cultural methods and care which they have not always received on private lands.

KARPER, R. E., VICE-DIRECTOR, TEXAS AGRICULTURAL EXPERIMENT STATION, COLLEGE STATION, TEX.

In response to your letter of the 19th I may say that with the general movement for planting trees and shrubs in the Great Plains I am in complete sympathy. In fact our substation at Lubbock, of which I was superintendent for a number of years, has probably done more than any other agency in the Southern Great Plains in encouraging the planting of trees and shrubs in this region. We have tested numerous species and have pretty definitely determined which species are adapted to the conditions in this region and the manner in which they must be handled and cared for in order to insure best growth.

This experience has taught us that though trees can be grown around the



homestead where they can be cultivated and watered if necessary, it is almost impossible to grow mass plantings without this care and attention. The promiscuous planting of a wide shelterbelt without regard to soil conditions, topography, moisture, and available irrigation water is, in my opinion, a questionable expenditure of money in view of the doubtful success of the venture.

So far as the amelioration of the climate is concerned I have no doubt that the shelterbelt, if it could be established, would have some effect on climatic hazards, especially high winds and accompanying sand storms, but I doubt very much whether enough growth could be established to bring about these results. Certainly it would be impossible in this region to bring about enough tree growth to have any appreciable effect upon evaporation and rainfall. On the other hand, if this same amount of money, or even a small fraction of it, were spent in encouraging and aiding, or even subsidizing, each individual farmer in this region to make plantings around the farmstead where they can be cultivated and watered these plantings would have quite a beneficial effect in ameliorating the conditions immediately about the farm home. We could give our whole-hearted support to such a program of individual farmstead plantings while we consider the project of mass shelterbelt plantings exceedingly questionable.

KEATING, MRS. W. R., DESINET, S. DAK.

Fifty years ago Mr. Keating helped plant a thousand of young trees on our farm in Eastern South Dakota, about three-fourths of them grew into mature trees, and we were very proud of our beautiful grove and it was a wonderful shelter here on the prairie but the drought

of the past four years killed most of them. We had ash, box elder, cottonwood, elm, oak, maple and black walnut. Willow, the box elder, and cottonwood lived nearly forty years, the other varieties not so long. We also had a few mountain ash, Russian olive, compass cherry, and apple trees but now they are most all gone, for lack of moisture, the fine old grove which gave shelter and beauty for many years is nearly all dead—except for a few ash trees that we hope to still keep on growing as we had rain lately.

POOL, RAYMOND J., PROF. OF BOTANY,  
UNIVERSITY OF NEBRASKA, LINCOLN, NEB.

Your letter of September 21 has been received.

My first reactions toward the proposed shelter belt project were very unfavorable because of the unfortunate and misleading propaganda that appeared in the daily papers. All this seemed to be put out by the Forest Service, and so quite naturally I was disappointed in the extravagant claims and promises that were made. My attitude has changed, however, since the Forest Service has combatted the initial impressions and appears to be going about the matter in the thoroughly scientific manner that we would expect. I look upon the whole project as a worthwhile experiment of a magnitude and a cost that would be impossible under normal times. Since I know that the U. S. Forest Service is undertaking the project in a very commendable and conservative spirit I am giving it my full support. They know, of course, that they are doomed to endure many keen disappointments, but on the whole the experiment should be carried out and through a long period of years.

A great many trees have died or have been severely damaged by the drought of the past year in this territory. For ex-

tended periods during the summer there was no available water in the soil to a depth of four feet or more. This condition coupled with an extremely dry and hot atmosphere was more than the trees could endure. Many different kinds of trees and trees of many different ages show the unmistakable effects of drought. We are accustomed to noting dry weather injury in the trees of this forest frontier but we have never seen anything like the conditions that occur on every hand this fall. Even hackberry and honey locust trees have suffered. Perhaps the most conspicuous damage is revealed by the elms and the conifers, particularly spruces.

RAMALEY, FRANCIS, HEAD OF BIOLOGY DEPARTMENT, UNIVERSITY OF COLORADO, BOULDER, COLO.

My observations in Colorado, South Dakota, Nebraska, and Kansas lead me to believe that the tree-planting scheme will be successful only in low-lying areas. I have seen many failures even where the trees survived for ten years or more. Within the last few years nearly every well in eastern Colorado and in the western parts of the states to the east has had to be drilled deeper because of falling water table.

It seems to me that a certain amount of wind erosion might be secured by the planting of hedgerows of hardy shrubs which are much more likely to survive than are trees. Each farmer might inclose his farm in this way or, better still, inclose every 20 or 40-acre field.

The supposed effect of tree planting on climate is, of course, a joke.

SCHMITZ, HENRY, CHIEF, DIVISION OF FORESTRY, UNIVERSITY OF MINNESOTA, ST. PAUL, MINN.

I am very sorry that illness has pre-

vented my replying to your letter of August 28 at an earlier date.

I am not qualified to express any belief, in the scientific sense of the word, on the merits of the Prairie Tree Planting Project. Opinion, however, is permissible where belief is not. In my opinion, trees can be grown on much of the contemplated area provided they receive *sufficient care and attention*. The important question is whether the benefits will justify the cost. We in Minnesota have had considerable experience in windbreak planting in the western part of this state and have some idea of the difficulties involved in prairie planting, and our conditions are not nearly as severe as those in central North and South Dakota.

One thing that really disturbs me in the publicity I have seen concerning the project, besides the fact that it is superficial and unscholarly, is the fact that the work of the Mandan Station does not seem to be mentioned. It is my opinion that the Mandan Station has had infinitely more experience in prairie tree planting than any other public or private agency, and not to utilize to the utmost the experience and knowledge of a staff of that station appears to be very short sighted policy indeed. To me it would seem like plain common sense to place the Mandan Station in a very responsible position in arranging the technical details of the planting program, even though it might necessitate coöperation with the Bureau of Plant Industry.

Before any public agency embarks on a seventy-five million dollar program, it would seem desirable to enlist the support and coöperation of a corps of qualified experts not only in the field of forestry, but also the fields of agricultural economics, farm management, biology and soils. This, of course, may actually have been done, but I have not seen or heard that it has been done. In my opinion, a



group such as this might visualize the project in a little different manner than the "planners of the project" visualized it in the illustration in Ovid Butler's recent article in *American Forests*. After all, there is much grazing land and probably a considerable amount of sub-marginal agricultural land within the strip. Does such land justify the expense of planting windbreaks under rather difficult conditions?

I think too, that the question of the influence of these shelterbelts should be carefully scrutinized. In many parts of the proposed strip a thirty or forty foot tree will be a large tree, and a thirty year old tree will be an old tree. How far reaching local influence will a twenty-foot tree exert. Much of the publicity I have seen, the source of which is unknown to me, implies that these breaks will exert a general influence on the climate of the region as a whole. Personally I should want more evidence of this than a naive reference to Russian experience.

I hope that you will not misunderstand this letter. I do not wish to criticize the President's program or the Forest Service in any way because I am heartily in sympathy with the high purposes of the program. I am sure, however, that the President is looking to technical foresters for guidance in the program, and that he would not wish to make any serious mistake.

Then, too, it is very difficult to make any worth while suggestion concerning the project because I have seen no official statement from the Forest Service or elsewhere as to what is actually contemplated. My information concerning the project has been obtained entirely from the daily press, *The Forest News Digest*, and Ovid Butler's article in *American Forests and Forest Life*. Why doesn't the Forest Service issue a brief statement

of what is contemplated and why the work should be done? This would be most helpful in clarifying the situation.

SEARS, PAUL B., PROFESSOR OF BOTANY,  
UNIVERSITY OF OKLAHOMA, NORMAN,  
OKLA.

In reply to your inquiry of the 18th I must admit that it is difficult to give a very useful opinion. I have understood that some of the publicity concerning the shelter belt project does not accurately represent what is really intended. However the fact remains that plans seem to have been developed without much consultation of ecologically trained men who are on the ground. For example, I discovered last month that Dr. Pool of Nebraska whose counsel ought to be exceedingly valuable had never been consulted. I assume that you have written him. If not, it may be worth your while.

With sufficient pains it appears that trees can be made to grow even in the short grass portion in this state, but like the timber claims of western Nebraska and Kansas such trees are little more than glorified shrubs, seldom exceeding 25 feet in height. This statement applies for the uplands. Along the stream valleys native trees such as cottonwood do much better. On sandy soil, however, throughout the state there is a natural growth of forest consisting of scrub and post oak and juniper. These patches of sandy soil are irregular in shape, not particularly useful for anything but trees and extend well west in the state. They have been badly abused by fire, overgrazing and attempted cultivation. If trees are needed for whatever they may be worth as climatic instruments the logical thing would seem to be to restore these sandy areas from unprofitable exploitation and see that they are really protected. If it appears necessary however to secure

land extending along an arbitrary pathway and use it in the program of conservation, my suggestion is that the restoration of native grassland by protection be combined with the tree planting project. This would permit the use of sectional areas and land not likely to be fitted for trees. After all the great source of climatic damage in this state comes from the impact of climate on soil which has been robbed of its humus. The restoration of humus by the vegetation matters most, regardless of whether it is woody or herbaceous. This seems to be the critical problem we are facing here.

With regard to drought injury apparently the worst damage was over east along the deciduous forest boundary rather than in the west. Trees which have managed to live thus far in the short grass country did not seem to mind the drought much, but eastward where many representatives of the deciduous forest have advanced toward the edge of their range, there was perceptible damage. If I can be of any further service please let me know.

THOMPSON, PAUL K., SUPERINTENDENT  
STATE EXPERIMENT FARM, GILLETTE,  
WYO.

Your letter of October 1; together with copy of federal tree planting plan statement; received and have given the matter considerable thought since you wish my opinion on the practical and feasibility of the plan.

It is a vast undertaking, requiring great expense and long number of years to complete. Soil types and conditions would have to be given study as well as the topographical outlines of the territory through which the tree belt would be planted. These things are necessary for the feasibility as well as the practical side of getting the trees to grow and be

of value to the country.

I believe the rainfall is sufficient over most of the proposed area for planting the trees, as I understand from reading newspaper articles it would cross the Dakotas, Nebraska and Kansas; however, there are sections which it would be impracticable to plant trees in a continuous belt so it would be necessary to leave gaps in some belts which might not necessarily come opposite in adjoining tree belts.

I think it would be inadvisable to plant the belts one mile apart, as is given in statement. I believe belts of trees from forty to eighty rods wide and spaced ten miles apart would be more practical and of much greater value to country in general.

We have set out trees and kept them growing on the station here for the past eight years, with the past four of these years very dry. So dry that in two or three years crops have been nearly a complete failure in this section. But to grow trees in this country it is necessary to plant them so they can be cultivated for several years at least to destroy weeds and for moisture conservation. New land or sod has to be plowed up and summer followed for a year while old ground has to receive extra cultivations to insure moisture for starting trees and keeping them growing until further rains occur, however, by following these practices it is possible to grow trees successfully.

On steep slopes it is advisable to work ground and trees crosswise of slope, rather than up and down hill, to prevent excessive washing and to keep more moisture in soil for trees.

It is possible farmers and residents along these proposed tree belts would do considerable of the work necessary in planting and care, however they would expect recompense. If CCC and other relief labor organizations are kept on,

they might be used in developing of this project. Under any plan supervision of ground preparation, tree planting and care would be necessary to a greater or less extent, depending on the condition of the country and the enthusiasm of local people and agencies in development of the tree belt.

It would require an immense amount of thought and work of a large staff, besides a great amount of labor over a long period to get trees safely growing.

Considering the greatest number of people and territory which the trees would benefit, both from a practical and attractive standpoint, and taking into consideration that it would not be economy or practical to plant trees in some sections due to conditions of the country. I think the plan feasible and practical, and one which might be of great value in such a large territory where climatic conditions have prevented many trees from growing.

I think before the plan was started it should be given consideration by states through which it would pass for their better coöperation and possible assistance.

I hope this may be a satisfactory answer to some of your questions and assist you in coming to a conclusion on the matter.

TOWLE, R. S., BUREAU OF PLANT INDUSTRY, SHERIDAN, WYO.

With respect to your inquiry of October 1 relative to shelterbelt plantings, I can only give the results of our experience here. So far, from 1917 to date, there has been little difficulty here in getting shelterbelt stock established except that conifers seem to require more favorable conditions than other stock, and have sometimes required replanting a second or third time before a stand was obtained. The matter of survival after a number of years growth is still uncertain. The

planting made here in 1917 still remains as a good shelterbelt, but some species unsuited for dry land have gone out altogether. This belt has been cultivated each year.

Conditions here may be somewhat more favorable than much of the territory included in the general shelterbelt proposed, but probably are not as favorable as at least a part of the eastern edge of the territory proposed to be included.

WATKINS, CLAYTON W., COLLEGE OF AGRICULTURE, LINCOLN, NEB.

The program now being organized by the U. S. Forest Service for establishing strip shelterbelts through the agricultural sections of six plains states should be of interest to residents of Nebraska. This tree planting program, although larger than any previous undertaking, is only a planned expansion of what has been going on in this state since the beginning of its development. Nebraska has been transformed, almost in one generation, from open prairie to one of the most productive agricultural states. Trees have played an important part in this development; not in bringing a great deal in direct returns but in furnishing shade, shelter and fuel for those who were far-sighted enough to see the agricultural possibilities in the state. There are people living yet who remember eastern Nebraska when it had very few trees except along streams, but today even the uplands of this section are well broken up with groves and field shelterbelts. The early settlers here came from states to the east where trees were quite common and naturally the lack of shade and shelter caused these people to attempt planting around their homes. In fact many of the covered wagons that were dragged through the Missouri River contained bundles of cuttings or small seedlings to be used in starting wind-



breaks or groves around new homes. If records were available they would show that many of the fine groves of trees through Nebraska now are the result of stock brought here by ox teams when Nebraska was being settled. Nebraska is internationally known for its interest and success in tree planting.

It is true that some of the trees that were planted did not grow because wind and drouth had their effect on plant life then just as they have now. Further, there was very little information in those days on hardiness of varieties or cultural methods necessary. Yet in spite of these handicaps there is ample evidence of the results from much of this early planting. We should appreciate this development and give credit to our pioneer settlers for their faith in the future of Nebraska. In times like these we need a little more of the old-time faith and spirit which together developed the moral fibre that characterized those who pioneered this state.

The plan for establishing this gigantic shelterbelt is not yet complete. However, fundamentally it is not a fantastic dream but a sound practical program not only to start trees but to give them the best possible chance to grow. This will involve a soil cultural program based on the best information available and applied to the locality where the work is being done. In addition every known method of moisture conservation will be employed in order to store in the soil all precipitation (summer and winter) because for any plant to grow there must be moisture for its roots. This soil culture and water conservation program will call for fallowing the strips to be planted with a lister or similar implement and these will follow the contours of the land even though such a method makes very short rows. Terracing of slopes that might otherwise wash or allow a heavy run-off will be an

important function in some sections. Snowfences will be set up on difficult or exposed sites as a temporary measure to hold winter moisture. To some these may appear as extreme measures, but if we continue to farm all of Nebraska's agricultural area these same measures will, before many years, be a part of the agricultural program for the production of ordinary grain crops. In other words, we cannot continue the exploitation of soil or continue to permit this loss of moisture through soil erosion, drainage ditches and careless farming practices, and still expect the same production that has in the past been possible when subsoil moisture stored up over long periods was available. Annual precipitation is limited in this section; in fact, there is probably not more than one year out of fifteen when rainfall exceeds the crop needs. After the experience of 1934 it is unnecessary to mention much about the other extremes. Therefore, to grow any crop in an area where we know from experience that the limiting factor is moisture, it is good business to begin with a program that will conserve all that nature sees fit to send.

The growing of trees is not unlike, nor any more difficult than the growing of other crops. The same principles that apply to one will apply to the other—good husbandry practices.

During this present drouth period trees that were planted on well-prepared soil and given regular cultivation lived through with very little damage. As a matter of fact, an acre of trees requires less moisture to live and grow than many of our common grain crops. Therefore, this shelterbelt program where soil preparation may be carried on for one or even two years for the purpose of storing up moisture and then planted with a definite program of cultivation can be made successful.

The purpose of this planting even though it is on a large scale is the same as that of smaller windbreaks that have been planted or are being planted around farms in the state to divert wind and check its velocity. What effect a hundred narrow shelterbelts, one planted each mile in a strip one hundred miles wide, will have on wind velocity is not definitely known, because no such planting has ever been made. It is known that such a planting will have a very beneficial effect on the area within and adjacent to the belt.

The question as to how soon a planting of this kind will be effective is difficult to answer except to compare it with smaller plantations of the past. A windbreak including rapid growing trees properly planted and cared for will offer some protection within five years. Railroad snowfences consisting of two rows of trees planted in various parts of Nebraska in 1929 and 1930 are now serving in place of wooden fences. Therefore, it is safe to assume that within a period of from eight to ten years these shelters will be effective.

The plan which will be followed in developing one of these individual strips will be first to prepare the ground as previously discussed, together with the fencing of the area against livestock. Next a careful selection of planting stock of hardy varieties including native trees and shrubs wherever possible. The outside row on either side will be a low spreading shrub which will grow up quickly and serve as a snowtrap for the belt itself. Next a row of hardy evergreens such as red cedar or possibly ponderosa pine. Then a row of rapid growing broadleaf trees, and the interior of the plantation will be hardy, tall-growing varieties. This belt when complete will have the low surface winds checked from the outside by the evergreens and the

shrubs, and the central part of the windbreak will give height to slow up and divert winds for a greater distance. The strip fenced for this planting will include sufficient area to leave some ten to twelve feet on either side between the last row of trees and the fence, and the trees within the belt will be spaced sufficiently wide to permit cultivation and to eliminate the danger of serious root competition. A belt of this kind with low growing trees on the outside together with the strip of cleanly cultivated land between the trees and the adjacent fields will not affect crops by root interference, but this crop will have the beneficial influence of protection against the drying out of soil and the mechanical damage of wind.

These shelterbelts even though they will be given regular cultivation as long as their growth will permit will serve as bird and game cover. This use, of course, will be of minor importance by comparison, but certainly will serve to replace brush lands, etc., which until they were removed by the progress of civilization served for these same purposes. To the individual farmer game may not be of great importance, but to the state as a whole it is very important and we have no moral right even though it may be legal to so handle our lands that the propagation of game is very difficult and in some cases impossible.

Every community in Nebraska from east to west or from north to south now has plantings which demonstrate that trees can be grown. These are often small isolated groves or windbreaks which have been subjected to the rigors of a climate which we must accept as normal and have still made a very creditable showing. A mass planting such as that proposed in this shelterbelt will have a decided advantage over individual plantations because each strip will be a self-protecting unit and will more nearly ap-

proach natural forest conditions. It cannot be denied, however, that many of the early plantations in this section were failures, partly because of improper or no cultivation, or damage from livestock and in many cases a poor choice of species. This is not a criticism of those who attempted early tree planting because there was very little plains tree planting information available at that time. In fact these failures have furnished a great deal of the information now serving as a basis on which this present program is being built.

The strips to be planted will be seven rods wide following the half section rather than the section lines, thereby eliminating the possible interference with highways. This method of location will also give each quarter section a part of the shelter. The strips will run east and west or north and south depending on the prevailing winds in the particular locality. No farmer will be required to permit this strip to cross his land; his land will be included only after he is convinced that it will be an asset to the farm and after some form of contract or lease is drawn. The strip will be fenced to keep out all livestock. Local labor will be hired to construct the fence and prepare the ground. With present moisture conditions it will probably be necessary to fallow these strips for at least one season before planting is started. This fallowing will be done with a lister rather than a plow as a moisture conservation measure and as a check against wind erosion.

The trees to be used will be selected with the greatest care and these will vary

with localities and sites. They must not only be hardy but also be of a type that will serve best as windbreaks. This group for Nebraska will include the following: red cedar, ponderosa pine, Austrian pine, mulberry, Russian olive, caragana, buffalo berry, Chinese elm, American elm, ash, cottonwood, honey locust, wild plum, choke cherry, hackberry, burr oak, and black walnut.

The fact that this proposed belt is to run from Canada to northern Texas does not necessarily mean that the strips will run north and south. In many places it will be necessary and advisable to run them east and west. These tree belts will be made to fit the community through which they run rather than attempting to make the community fit the tree belt. The purpose of this undertaking is to locate and develop shelterbelts that will serve best in resisting prevailing winds. In other words, there is no "cut and dried" plan or checkerboard layout which will have to be followed.

To say now what this series of tree belts would or would not do toward checking the forces of natural elements, which the people of the Middle West realize are actually threatening the foundation of agriculture in this section, could be no more than a guess based on the results of smaller windbreaks. That something must be done toward checking wind and water erosion and in conserving the moisture that falls and runs out of the state is not a guess if we expect the soil of Nebraska, which is its only source of income, to continue production.



## THE GRAND SHELTERBELT PROJECT

By WILLIAM L. HALL

*Consulting Forester, Hot Springs, Ark.*

THE writer has no sympathy for the chronic critic. He is inclined to say "go ahead" to the bold spirits who spring gigantic, lovely schemes and endeavor to put them into effect. They sometimes succeed. On the other hand he is unwilling to give joyous approval or even tacit assent to a project which promises to be costly in the extreme and which he knows to be uncertain of success. That is his position in regard to the great plains shelterbelt plan of the present administration.

In this particular case the writer has had unusual opportunity to observe the fundamental conditions that must be dealt with. In 1887, 88, and 89 as a young boy he was in the whirl of timber claim tree planting in western Kansas and eastern Colorado. He helped plant one or two of the groves. In 1897 to 1899 while an advanced student in the State Agricultural College at Manhattan, Kansas he had considerable experience in making experimental tree plantations under plans worked out by the United States Department of Agriculture. This in a locality about one hundred miles east of the proposed shelterbelt. From 1899 to 1905 as superintendent of experimental tree-planting work of the federal Division of Forestry he had the privilege of studying the whole of the Great Plains area from Canada to Texas. In the course of that work he observed hundreds of western tree plantations, many of them in the area now proposed to be dedicated permanently to tree growth.

On the basis of that experience, supplemented by later observations the writer holds the opinion that only a small per-

centage of the area proposed to be forested is by nature adapted to any sort of tree or shrub growth. The favorable lands are in the narrow bottoms of streams where there is some protection from the winds, where soil is more favorable, where at times the land receives flowage water from the uplands and where in some instances underground water is within reach of tree roots. By liberal estimate not over two per cent of the proposed shelterbelt area can be placed in this favorable class. The rest of the area is upland where nature with great fixity of purpose has determined upon grasses as permanent cover.

To shift to trees as permanent crop means a fight with nature every step of the way. Let no man underestimate nature's powers as an antagonist in that region. She is always on the job, always ready and able to make man's efforts look silly and sometimes she put up a terrific offensive, as she did in 1894, 1934 and at various times in between. Always in that region cultivation is a highly desirable practice to encourage tree growth and in extreme drought cultivation must be supplemented by water if trees are to live, and those are just the times when no water is available.

It is perhaps not known to all that in that region upland tree belts do not generally renew themselves by natural seeding. Tree mortality is extremely heavy and when trees die they must be replaced by hand.

Because of these conditions peculiar to that region it must be understood that success if it is to be achieved on any considerable scale will come only by

maintaining practically garden conditions at all times. Throughout the extent of the project there must be proper selection of trees, which is possible; all necessary cultural attention throughout the years, which is most unlikely; and this further-abundance of water during the driest times, which simply cannot be provided.

Most likely outcome of this experiment is that judged by any fair appraisal it will be less than a 20 per cent success.

At some period in the future this administration or some later administration will recognize the failure and drop the project like the proverbial hot potato. The net result may be several hundred thousand acres more of good western grass land broken up and exposed to the fury of wind erosion.

If the Administration is willing to consider the results of tree planting on the Western Plains during the past sixty years it will not go far with this project.

## THE SHELTERBELT SCHEME

By ROYAL S. KELLOGG

*New York City*

THE proposed 1,000 mile federal shelterbelt from Canada to the Texas Panhandle, following roughly the line of 19 inches annual precipitation and the 100th meridian of longitude, has received acclaim from that part of the general public which thinks that any kind of tree planting anywhere is a good thing, and from other parts of the public which are under the erroneous impression that forestry is chiefly tree planting.

Many experienced foresters, however, are certain that aside from an effort to give employment in the name of relief, the scheme has little to recommend it from any practical or scientific standpoint. There has been a dearth of discussion of the project in the light of known facts as to the region concerned and the possibility of growing trees permanently in large parts of the area.

The scheme in brief, according to official statements, is to plant 100 continuous belts of trees, each 7 rods wide, 1,000 miles long and 1 mile apart, and to adequately fence each of the belts. It

is also said that the area to be planted will be some 1,800,000 acres, although the specifications figure out at 1,400,000 acres. There seems to be no exact statement yet as to the total number of trees required for this planting. However, in order to produce the density of stand required for a shelterbelt and to allow for inevitable mortality, a spacing equivalent to 4 x 4 feet, or 2,722 trees per acre should be the minimum. Since cultivation of the planted area will be necessary in order to keep out weeds and conserve scanty moisture, planting 2 feet apart in 8-foot rows is a good way to permit easy cultivation for the longest period of time. To plant 1,800,000 acres with 2,722 trees per acre will call for nearly 5 billion seedlings.

Present estimates are for a total cost of \$75,000,000 which is equivalent to \$41.65 per acre for the 1,800,000 acres to be planted and fenced, and \$1.17 per acre for the 64,000,000 acres included within the exterior boundaries of the project. Were the scheme carried out in its entirety, the final cost would doubtless

much exceed the preliminary estimate since this is what usually occurs in long-time undertakings.

The only sound justification for the plan must be the beneficial effect of shelterbelts in retarding wind velocity with a consequent lessening of evaporation of soil moisture. If these results are not secured by the means employed, the whole project is nothing but a delusion and a criminal waste of the taxpayer's money which should not be countenanced by men of scientific training and accomplishments such as professional foresters are supposed to be. Let us look at some of the facts.

I am taking western Kansas as typical of a large part of the region under consideration and am quoting rather liberally from Bureau of Forestry Bulletin No. 52, "Forest Planting in Western Kansas" published in 1904, because that bulletin contains authoritative data upon precipitation, wind velocity, evaporation and the effective range of shelterbelts.

#### CLIMATE

"The climate of western Kansas is ordinarily classified as subhumid or semi-arid. Its chief characteristics are those common throughout the Great Plains. The average annual precipitation is sufficient for paying crops. The distribution, however, is subject to great fluctuation whose erratic courses may or may not overlap.

"There is also a marked tendency to a succession of wet and dry seasons over the entire region. This is well illustrated by comparing the records at Dodge for 1883 and 1884 with those for 1893 and 1894. It happens that there is a ten-year period in this case, but observations do not prove any regular periodicity.

#### ANNUAL PRECIPITATION AT DODGE, KANSAS

<i>Year</i>	<i>Inches</i>	<i>Departure from normal</i>
1883	28.50	+ 8.12
1884	30.36	+ 9.98
1893	10.12	—10.26
1894	12.60	— 7.78

"The wet years of 1883 and 1884 were largely responsible for the 'boom,' which resulted in the rapid settling up of the country between the years 1885 and 1887, while the dry seasons of ten years later caused wholesale depopulation.

"One of the most disagreeable characteristics of the climate of the Plains is the high winds, which sweep across them unhindered by either natural or artificial barriers. The prevailing direction is northwest in winter and southerly in summer, and soil moisture is absorbed with extraordinary rapidity, especially in the warm season. The dreaded 'hot wind,' which strikes growing crops with such deadly effect, is a hot, dry blast of air that takes water from the leaf surfaces of vegetation faster than it can be supplied by the roots; consequently plants wilt and even die if the wind is long continued. The northerly winter winds, while causing much less evaporation, are hard upon stock and trying for men.

"The average wind velocity at Dodge City, Kansas, is 12 miles per hour. In spring, however, it is considerably higher, especially in the afternoon hours, when an average speed of 20 miles an hour may be maintained for a month at a time. High winds are also quite frequent. In the ten years ending with 1903 there were eighty-one occasions on which the wind blew at the rate of 40 miles and upward an hour.

"As a result of these constant drying winds, taken in connection with the meteorological conditions which prevail in western Kansas, the annual evapora-



tion from a water surface is about 54 inches. This means that if it were possible to have a lake in western Kansas whose level depended wholly upon direct precipitation and evaporation, its annual decrease in depth would be 34 inches. The relative humidity according to the Dodge record, averages 60 to 65 per cent. The following table is especially instructive:

ANNUAL PRECIPITATION AND EVAPORATION

Station	Precipitation Inches	Evaporation Inches	Excess of evaporation Inches
Amarillo, Tex. ....	21.94	55.40	33.46
Dodge, Kans. ....	19.84	54.60	34.76
North Platte, Nebr. .	18.27	41.30	23.03
St. Vincent, Minn. . .	19.50	22.10	2.60

“Thus it will be seen that the great wheat-growing district of the valley of the Red River of the North has a precipitation practically identical with that of western Kansas, and slightly less than the Staked Plains of Texas. The southern region, however, has more wind, higher temperature, greatly increased evaporation, and a more uneven distribution of rainfall. These are adverse conditions for planting and growing trees, and to overcome them requires an intelligent selection of species and a system of cultivation which reduces the evaporation of soil moisture to a minimum.”<sup>1</sup>

WINDBREAKS AND EVAPORATION

“One of the most important functions of the windbreak is the saving of soil moisture within the protected area. In the Monthly Weather Review for Septem-

ber, 1888, were published the results of experiments made by the United States Signal Service to determine the effect of the rate of wind on evaporation from a water surface. The experiments were made with a Piche evaporator, under constant conditions of humidity and temperature. The figures obtained are given in the following table, in which wind velocity is expressed in miles per hour and the unit of evaporation is that in a calm:

Wind	Evaporation
5	2.2
10	3.8
15	4.9
20	5.7
25	6.1
30	6.3

“A 25-mile wind is not uncommon on the Plains, and since it causes six times the evaporation that would occur in a calm at the same humidity and temperature, one can easily understand the rapidity with which the moisture from a summer shower disappears. Taken the year through, the wind averages more than 10 miles an hour, which is sufficient to cause four times the evaporation there would be in a calm.

“An experiment made by King<sup>2</sup> furnished some interesting information in regard to the checking of evaporation by a windbreak. He used a modified form of the Piche instrument, placed so as to give the evaporation from a water surface 1 foot above the ground at varying distances from an oak grove. Taking the evaporation at 20 feet from the grove as unity, the following results were obtained:

<sup>1</sup>For a detailed discussion of the climate and geology, the reader is referred to publications of the U. S. Weather Bureau, and the paper “The High Plains and Their Utilization,” in Vol. IV of the Twenty-first Annual Report of the U. S. Geological Survey.  
<sup>2</sup>F. H. King, Bulletin No. 42, Agric. Exp. Sta. University of Wisconsin, October, 1894.

<i>Distance</i>	<i>Evaporation</i>
20	1.00
100	1.29
200	1.41
300	1.66

"Neither the height of the grove nor the rate of wind is given, though the statement is made that a light wind was blowing. The table shows that the evaporation at 200 feet from the windbreak was 41 per cent more than at its base, and at 300 feet 66 per cent more. The evaporation from 300 feet onward was practically constant, showing that to be the limit of the influence of the windbreak in this experiment.

"While a few accurate experiments have been made to determine how far a windbreak is effective, it is a safe practical assumption that it protects the ground for a distance equal to ten or fifteen times its height—some observers say a rod for every foot. If a large field were crossed by a series of windbreaks 30 feet high and 20 rods apart, there is no doubt that they would be very effective, since the wind would reach each succeeding break with diminished force."

If we concede the improbability that the proposed planting is 100 per cent successful and that in consequence a perfect shelterbelt is permanently formed over this 1,000-mile north and south stretch for every mile of east and west distance, it is obvious that the plan is wholly inadequate to accomplish the purpose set forth. With perfect success from the tree-growing standpoint, the average height of the shelterbelt after many years would not exceed 50 feet and the maximum effective distance for a windbreak 50 feet high would not exceed 50 rods. Since there are 320 rods in a mile it is evident therefore, that we must have six shelterbelt strips per mile instead of one with a consequent planting

of some 30 billion trees and a possible expenditure of \$450,000,000 instead of the \$75,000,000 proposed. This would be equivalent to \$7.00 per acre for every acre of land included within the exterior boundaries of the 100 by 1,000 mile strip or over \$8.00 per acre for the area within these boundaries not planted and left for the residents therein to live upon.

There is nothing new in the idea of shelterbelt planting. It has been rightly advocated for farmsteads for countless years. The only new thing in the present project is the naive assumption that elemental forces can be controlled over an area of 100,000 square miles at a cost of less than astronomical proportions.

All of the arguments advanced in favor of the scheme, however, wholly overlook or minimize the geological climatological factors which have resulted in the present natural forms of vegetation. The end form of vegetation for the Plains area in the present geological epoch is grass and the soil did not blow away—aside from local sandhill areas—until the settler came in with his breaking plow and destroyed the natural sod. Trees, with scattered and scrubby exceptions, grow naturally and permanently throughout this area only where the roots can get down to moisture. The High Plains offer no such opportunity. Man raises trees in the High Plains area only by constant care and cultivation to conserve the small amount of precipitation, but in any year his efforts may be completely nullified, as has been the case in 1934. Nature clothed the Plains with buffalo grass and other hardy species, just as she covered the northeastern states with pine and spruce and hardwoods. We might conceivably cover the High Plains with trees and we might carpet the state of Maine with buffalo grass—but if we are sensible we shall try to do neither.

## THE PLAINS SHELTERBELT PROJECT

By C. G. BATES

*Senior Silviculturist, U. S. Forest Service*

THE proposal, first made public in June of this year, and officially launched by President Roosevelt's Executive Order of July 21, to plant shelterbelts upon the Plains to an extent and degree sufficient to have some measurable effect on the physical conditions of the area, has both excited the popular and professional imagination, and also given rise to a great deal of technical discussion. Believing that most of the skepticism regarding the project is based on honest doubts as to whether trees will grow in the area, and not upon any doubt as to the desirability of having them there if they will grow, I have devoted most of the space of this article to this phase of the question. It is impossible to go into any aspect of it in detail: I have therefore tried to give an honest professional opinion as to why greater success has not met the efforts of private planters in the past, and how the difficulties which are certain to be met can be overcome by the technique of the forester. It is not an undertaking in which slipshod methods will succeed; it represents a challenge to the technical skill of the profession and will require that our coming foresters develop a technical skill and a love for the soil which has not been much in evidence in the past. There is probably not a single "job" in the entire undertaking, of any importance, but that will require a very fair comprehension of the entire physical problem and the steps by which that problem must be met. Hence the desire to place on record the ideas which have been the groundwork of the project so far. Not one of these

ideas but must be subject to change with advancing knowledge; hence they are not put forward in any dogmatic spirit.

## POSSIBILITIES OF FOREST GROWTH ON THE PLAINS

The first question which comes to the minds of most foresters and of many laymen who are only vaguely familiar with the Plains is: Can trees be made to grow within the zone selected for shelterbelt planting?

Although there have been many failures in past planting by individuals, and there are valid reasons for the assumption that the general region selected for this project could never naturally produce upland forests, the evidence of tree-growing possibilities is so convincing to one who weighs it analytically as largely to nullify doubts as to success on the larger part of the area. The most difficult, and to some extent impossible, areas within the region are associated with "dead flatness" of topography and heavy soil conditions which have developed therefrom. Without attempting at this time to describe these soil conditions, it may be said that there are a few large areas of this kind which must be delineated and exempted, and that small spots (mainly depressions) occur throughout the zone, on which tree planting is not feasible because of excessive alkalinity or shallowness above clay-pans. These may be from a few square feet to many acres in extent.

Within cultivated lands, which it is desired to favor most, the best conditions are found with a moderate degree of re-



lief, while certain areas with considerable relief, and generally with sandy or rocky soils, largely used for grazing, doubtless offer very good possibilities, but should be left out of the systematic plan because it is believed that shelterbelts, as such, can have little effect on such lands. On the other hand, planting here in a less regular pattern to prevent erosion and to conserve run-off may be higher desirable.

Again, certain very flat and somewhat sandy areas, subject to much soil blowing, appear to offer unusual opportunities for tree growth, presumably because of a water table within reach of roots.

When all is said, the greatest difficulties arise from the very high water-holding capacity and lack of permeability of some of the heavy soils which are fairly good for agriculture. These qualities limit the depth of penetration of moisture and also give insufficient aeration for perennial roots.

From the climatic side, the limiting factor is, of course, precipitation. The "effective" moistness is essentially the same from north to south in the zone, but grows less from east to west. The recent drought, which has been by no means uniform in severity, has tended to make the area appear spotty. The next drought is likely to strike hardest, of course, in different places. Neither this variable, nor the character of a climatic cycle in which the region might find itself 100 years hence (refer Dr. Huntington's article, *JOURNAL OF FORESTRY*, November, 1934) is subject to analysis or forecast, and we do not know of such long distance factors being taken into consideration in any human activity.

That the normal moisture is not prohibitively low in this area, with a mini-

mum of about 17 inches per annum at the extreme north end of the zone, is shown by the fact that some success in tree planting has been had in Montana and Colorado with 15 inches or less. However, less than 17 inches or thereabouts<sup>1</sup> will not permit reasonably dense forest growth and attainment of the objects of this project, except the aesthetic object.

The favorable tree evidence is found in the survival through the recent drought of many groves which present conditions far from ideal, in occasional instances of almost ideal "forest" conditions brought about through good planning and intelligent care, and in the fact that even in such a year as 1934 new plantations have been successfully started. Opposed to this evidence we have the dying of cottonwoods over 40 years old very generally where the drought has been severe, a phenomenon which should not be at all alarming to anyone who stops to consider that trees vary tremendously in their life cycles, and those which grow fastest are least likely to be long-lived. In truth, much of the mortality denotes nothing except that trees on the Plains, as elsewhere, must have some opportunity for renewal, and that those approaching senility may be "knocked off" prematurely by excessive drought. Alongside cottonwoods, willows, and boxelders which are almost wholly gone, one may find ash and elm of equal age surviving excellently where the trees are not too crowded. This is not to imply that all groves of these species have stood well; in many cases there has been too severe exposure, damage by grazing and insects and even burial by sand added to the direct effects of drought.

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<sup>1</sup>Revised and up-to-date means probably will show the averages to have declined from those given out in 1920, which are our present basis.

## FOREST CONDITIONS CAN AND MUST BE CREATED

Nothing herein said is intended to imply the expectation of growing "commercial timber" with less than 25 inches of rainfall and, in truth, this phase of tree growing is likely to be more fully attained if it is not "pushed to the front" too strongly in the planning. The first requirement is to insure growth, in the mass, with the hope that a few good trees will emerge. If the aims of shelterbelt planting as here defined can be attained, broadly speaking the best trees will be obtained, but if the former are not attained we shall have next to nothing.

In this plan, the individual tree becomes entirely subordinate to the mass, both for its own protection against wind and that a really effective shelterbelt may be created to protect the adjacent land and crops. There never was a better illustration of the social axiom "united we stand, divided we fall."

Next after massing to reduce as greatly as possible the wind exposure of the individual tree and its water requirement, the primary object must be to retain litter against the tendency of the wind to remove it, to fully protect the forest floor against drying while making it receptive to moisture. Grass cover is almost certain to be crowded out if this occurs, but if some low shrubby growth finds its way in, especially where small openings occur, it will probably more than pay for its moisture use by its value in retaining litter and shading the ground.

### SPACING

Fairly close spacing at the outset (not over 6' x 6' and probably 4' x 6' for the species which do not grow rapidly or spread quickly) is the means by which the early period of cultivation is to be

shortened and the era of litter accumulation inaugurated in lieu thereof. This, of course, should be followed by thinning whenever it seems desirable to do so in preference to permitting weakening of all the trees by "letting nature take its course." Thinning is probably more necessary in the planted forest on smooth terrain than in most natural forests because of the extremely even start which the individuals obtain.

It is probably not true that quite the same spacing standards are desirable in the north and south portions of the Shelterbelt zone, but this remains to be proven by more careful observation. Certainly close spacing has gained great favor in the north, partly as a result of recent drought showings in which, without doubt, the mass protection secured in the close-planted groves was a large factor in saving all or most of the trees.

### CULTIVATION VS. LITTER ACCUMULATION

No one denies that cultivation, for a few years, of tree plantings on plowed ground is necessary. But one observation on what may be called the "physics of moisture conservation by the soil" tends to bring sharply to the fore the value of the forestry concept in plains planting, in contrast to a concept which has prevailed a good deal in past planting. Wide spacing, of course, means a long period of cultivation if the trees are not to be overcome by weedgrowth or the slower invasion of grasses. It has in some cases been carried to a degree suggesting orchard development of individual, round-topped trees, desirable for yard purposes but having little value toward creating a shelterbelt. Not only is the water requirement of each such individual necessarily large because of the large crown and complete exposure to sun and wind, but in my calculation the

retention of moisture by frequent stirring of the surface soil is very wasteful, particularly as regards the smaller accretions of rainfall. In a soil so cultivated, about an inch of water is required to wet the first  $\frac{3}{4}$  inches of soil, and to make any addition to the soil below, which is theoretically kept moist. All which remains in the stirred zone is, therefore, almost immediately lost, being re-evaporated without affecting the soil in which roots grow. Much less than an inch of rain will percolate through any ordinary layer of air-dry forest litter, wetting the mull beneath it, and once in that zone is practically free from evaporation loss. I have recently, along the eastern edge of the Shelterbelt zone in North Dakota, seen splendid, healthy fine "feeders" rising vertically from the deeper roots to within half an inch of the litter, to absorb this surface moisture. At times this would be the only moisture available, as has probably been the case this summer, the subsoil in this forest being bone dry in October. This is a real forest (mostly ash), as attested by thrifty specimens of basswood, by natural reproduction, and by brushy undergrowth. It has survived, almost 100 per cent through the drought, because it had natural "soil preparation" and protection for drought, through the agency of litter accumulation.

Occasional examples of planted groves through the region, which have been fenced against stock, "gone wild," developed undergrowth, reproduction, and a *forest floor* condition which conserves and makes useful the entire moisture supply, give evidence of the possibilities of the region. Not in all cases can as good results be obtained, as those just cited, but the best results possible for a given soil and rainfall will, it is believed, always be obtained by working toward the objective indicated.

As one forester who has had years of

experience in aiding settlers to grow trees has expressed the matter: "If the Shelterbelt Project is to succeed, we must grow forests even though we can't grow timber." The exposed tree is at a great disadvantage unless both the space allotted and the soil character permit unlimited rootspread and depth.

#### ARRANGEMENT OF SHELTERBELTS

The next most obvious requirement to attain the above-described ends is to so "construct" shelterbelts that they do not rise from the plain like the proverbial "sore thumb," but rather in the shape of a roof with a wide sweep at the eaves. This refers, of course, to the cross-section at any point at right angles to the long axes. The plan is in sharp contrast to most of the old, extensive belts and groves, which are unprotected on the sides, free from limbs below, and entirely open to the wind. Very rarely does one see a windbreak in which the idea of side protection is fully carried out. It is not only desirable for protecting the interior of the forest from wind, but to make a real barrier to ground wind, and may deflect the currents upward sufficiently to make the protection felt for a maximum distance in the lee.

The requirement is simply met. There will be, for example, about 3 rows of the tallest-growing species which can be used, in the center, flanked on each side by about 6 rows of shorter hardwoods and 1 row of still shorter conifers, such as red cedar, ponderosa pine, or blue spruce. The conifers will retain their limbs well down, if lighted on one side. Outside of the conifer rows may be employed the equivalent of 1 or 2 rows of shrubbery. The trees occupy a width of about 100 feet, the shrubbery about 25-30 feet more. When allowance is made for a sand-trap, at least a rod wide, required if there is a



blowing field on the north or west, or a snow-trap, or a water-trap, and a driveway on one side, a width of about 10 rods, or 165 feet between fences will be needed in some cases. This width will be employed, rather than  $\frac{7}{8}$  rods as at first contemplated, until the various requirements are fully understood and the acquisition personnel can be trained to pass judgment on the requirements of the individual situation. It is possible, too, that less than 17 rows of trees can be made effective when flanked by brush.

The above discussion reveals a number of minor points which it is desirable but impossible to discuss. It suggests only one of many possible "designs" which may be used in different situations.

#### PROTECTION

The final, or one might well say the first, requirement for insuring "forest conditions" and the advantages which go with them, is protection from stock. This matter has been investigated in the central hardwood region, and elsewhere, sufficiently so that the effect of stock-trampling on the condition and moisture-absorbing capacity of forest soils is now evident. Where any run-off is possible, these considerations would be very important in the Plains. And in addition, as has already been pointed out, the effect of grazing in keeping the trees limbed, the ground open and free from brush (or even weeds) which might help hold the litter in place, is the "final straw" which cannot be carried.

Therefore, the fencing of shelterbelts against ordinary depredations has been considered a primary essential, even though a large item in the total cost. Sheep and hogs, where they are grown, make a still more expensive fence necessary. For hogs, only woven wire is effective, and it has been thought possible

that the main shelterbelts might avoid immediate proximity to farmsteads in order that the main shelterbelts might avoid im-taken. A better guarantee, however, will probably be had by making the farmer sufficiently interested in having the shelterbelt adjacent to his barnyard, so that he will himself bear the expense of any special fencing that may be required.

One of the major "crimes" of the prairie farmer has been to go to great labor to establish trees, only to leave them to the depredations of stock after a few years. This is understandable, however, when one considers the value of shade to stock, and especially to cattle during "fly time." The question has therefore been raised whether the plains farmer will not be antagonistic to shelterbelts which, though giving the cattle a welcome protection against wind, are not available to them for shade. It is believed that this possible objection can be overcome by assisting the farmer to plant and himself care for a small "off set" from the main windbreak, extending into his pasture, or a small independent clump of trees, either of which could be opened to stock after a few years. Such planting immediately adjacent to a shelterbelt would have only the advantage,—but apparently an important one,—of protection by the other trees, which might offset to some extent the effects of its own abuse.

#### MIXTURES, SPECIES, ORIGINS

Any such "design" as has been mentioned implies using several species in row mixtures, and presents many problems of associations so arranged as to prevent the injury of one species by a neighbor more rapid growing, "stiff limbed," or avaricious for light or moisture. Generally, a row or two of a given species will carry through from one end

of a long shelterbelt to the other, but sharp changes in topography may break the continuity. Where it becomes necessary to make the rows, for cultivation on contour lines, more or less transverse to the axis of the shelterbelt in order to avoid cultivation up-and-down-hill with its encouragement to run-off, the integrity of the long species rows can still be maintained, but the spacing will be somewhat uneven in these rows.

Naturally, the species to be used are almost entirely those "tested and true" representatives which are native to the different parts of the region, of conservative growth habits, and, most important of all, adjusted to some degree of tolerance to the prevailingly limey soils of the plains. This also implies the use of strictly "local" seed, because there are almost as great variations within species, in degree of adaptation to these conditions, as between widely separated species. I shall not attempt to enumerate all the species involved since it is the principle of adaptation to the local environment which is important. It is, of course, true that except as now found in plantations, the native trees generally occur in side-hill coves or on stream-bottoms. But even so, their adjustment to the climate is adequate to make them greatly superior to species or forms from a distance.

No species will be planted *because* it is fast-growing. It is felt that hardiness and longevity, which give the greatest assurance of permanence to the shelterbelts, are far more important considerations than the saving of a few years in reaching a given height. Such species as the native cottonwoods will find much use because, even though not as long-lived as others, they are best adapted to poorly-drained, alkaline, and unaerated soils, and give the extra height needed when the shelterbelt crosses a depression.

Only a few exotics have stood most of the tests to which native trees are subjected, and even these cannot be employed with entire assurance until their trials have covered every known climatic extreme. However, Chinese elms, Russian olive and Caragana are of high value and will be used sparingly. There is scarcely any doubt but that the entire field of exotics, especially those from the "continental" climate of eastern Asia, deserves exploration. A testing ground for species, should and probably will be developed in order to relieve the extensive plantations from the risks of experimentation, and such a testing ground can also contain experiments covering mixtures, designs, mechanical effectiveness of wind-breaks, and all such matters.

#### NURSERY AND PLANTING PRACTICE

The present plan proposes to make use of the facilities of commercial nurseries for growing stock for shelterbelt planting, so far as it proves feasible to do so. This does not preclude the establishment of government nurseries, which are likely to be the more needed if and when commercial nurseries are able to make any "normal" number of private sales.

It is not important to this discussion to speak of the ordinary nursery "problems" that are likely to be encountered. The recognition of a few general principles is believed to be essential to the success of the project:

1. Stock will not be grown in nurseries far to the east of the Shelterbelt Zone where greater precipitation tends to produce large, "soft" trees.

2. Stock grown in nurseries in or close to the Shelterbelt Zone will not be watered heavily. The usual procedure must be followed with coniferous stock, but aside from necessary watering to sup-

plement rainfall during germination, it is believed hardwood stock can better be grown with very little water, except, of course, in real emergencies.

3. The stock will be planted very young.

4. The whole object may be said to be to have thoroughly hardened trees, with small tops; roots in as high ratio to the tops as is possible in heavy and fairly fertile nursery soils; good root length yet not more than can be lifted in entirety and planted without cramping or deformation.

Strange as it may seem to many, it is not believed that the *immediate risks* of planting in the plains region are not as great as in most forest regions, because the accepted plan of cultivation during the first few years greatly reduces the chances of loss from competition. Admittedly, small stock may, occasionally, be lost by burial under drifting soil, but where this risk is evident before planting is done, it will be met by the prior creation of a "sand-trap," probably consisting of a row of brush (chokecherry, for example) planted just inside the fence, and a rod or two from the nearest tree rows. It is a fact, however, that a wire fence, generally, makes a sand trap with the aid only of thistles blown from adjoining fields.

Actual tests at Mandan have shown that when small ash seedlings are separated into 4 or 5 grades according to size only, Grade 3, or trees of less than average size, generally give the highest survival. (Information from E. J. George). The explanation, of course, is that a tree in a dry soil and practically full sunlight, must first busy itself with the sinking of a root, and the activity of only a few leaves is required to make this possible, perhaps actually to encourage it.

If, then, there is not as much concern as usual about the question of immediate

survival, there is great concern as to the development of a "normal" root system uninfluenced in its adjustment to the planting site by any previous artificial treatment of the tree. This is a brief discussion to give the subject; it is believed to have some interest to forestry in general and it is hoped can be discussed at some later time with more positive evidence to support the principle.

The logical sequel of this principle is to start trees in the field directly from seed, a practice which can be followed, of course, with nuts and acorns, almost as safely as planting. The smaller-seeded hardwoods, however, are not so vigorously "tap rooting" as to make this necessary.

As to planting methods to be employed, little need be said except that it is the intention to plant well, rather than speedily. Special methods of deep-hole preparation will probably be experimented with, for soils which have a hardpan, clay-pan, or lime layer, too close to the surface. To lay a foundation for such experimentation, a study is now being conducted to determine just what the tree-root development is,—particularly downward,—in different types of Plains soils. This will probably indicate the true nature of the problem and whether there is any possibility of meeting the problem of "pans" by artificial treatment.

#### THE INFLUENCE OF SHELTERBELTS

While, of course, the psychological "influence," or the aesthetic value of trees, has a great deal of bearing upon their planting everywhere, and has been an extremely important factor in all forestry activities, nowhere is their need felt more keenly than on the Plains. This is not only because of the dearth of natural tree growth but even more largely because of the depressing lack of relief in the topog-



raphy, the unbroken monotony of the ground underfoot, the horizon and the sky itself. It would, of course, require a psychologist properly to analyze just what feelings this engenders in residents of the region, what effect it may have on their mental and physical well-being. But, I am sure everyone "senses" the importance of the lack of trees and of the things which are associated with them.

Apart from this largely mental attitude which everyone has towards trees, human beings and, of course, all animal life, come within the scope of their physical influence, particularly as this can be expressed by their giving refuge from sun and wind. One must *experience* the effect of a steady wind averaging 10 miles per hour for months on end, to really know the meaning of the word "shelter."

In my opinion, these largely intangible *human* values, which space will not permit me to discuss in an effective manner, are fully as important an element in deciding the desirability of shelterbelt planting as any values which can be expressed in physical or economic terms. But this is not the kind of a subject in which argument can have much effect; one either "feels" these values or one does not. Therefore, the decision to leave this matter to the sane sentiment of the profession, without trying to impose my own deep-felt feeling for the Plains region on anyone.

#### REDUCTION OF SURFACE WIND

There really seems to be no controversy on the point that tree windbreaks reduce the velocity of surface<sup>2</sup> winds in their vicinity. The question is, how much and how far to the leeward? Estimates have varied, as is to be expected when one con-

siders the variable conditions under which such measurements might be made. It is a fairly good consensus of all observations and opinions, however, that the effect, which may amount to as much as 80 per cent reduction in velocity directly behind a good windbreak, has just about tapered-out to insignificance at 20 times the height of the trees. The distance and degree of effect may well be appreciably less than this if the windbreak is not thoroughly tight, and may well be appreciably greater if the shelterbelt is both tight and so shaped as to give a definitely upward thrust to the current which strikes its windward side. There is, in addition to protection on the leeward side, quite an appreciable "cushion" of calmed air on the windward side, if the windbreak, again, is tight near the ground.

There seems to be little probability, in theory, that the measurable reduction of wind by a single windbreak becomes "cumulative" where numerous shelterbelts are involved, and thereby affects an area far to the leeward of the last shelterbelt. We should realize that the matter mentioned can only be conclusively proven by most exhaustive and comprehensive experimentation, if at all. Not even the measurements behind single shelterbelts have been precise enough to show whether, beyond 20 times the tree height, there is absolutely full resumption of the original wind velocity.

This matter of wind calming has almost everything to do with the value of windbreaks in increasing human comfort and that of animals which find refuge in or near a grove, in blustery weather. It is not merely that a constant fight against the mechanical force of the wind is wearing upon physical and nervous energy,

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<sup>2</sup>Generally measured 4-6 feet above ground, so far as known.

but also because wind is such a potent factor in cooling any animal body. Animal husbandrymen recognize that a good shelter from the wind, during the day, is valuable in terms of pounds of cow feed, just as is a good tight barn at night. Human beings, almost anywhere, well know that they can work in great comfort within their yards, surrounded by windbreaks, when existence in the open fields would be practically unbearable. If what is implied by this statement is not to "ameliorate the effects of weather on a large scale," then we do not know the meaning of these words.

#### CONSERVATION OF MOISTURE

Although crops are often damaged directly by wind,<sup>3</sup> and soils also, from the standpoint of average crop benefits from shelterbelts, the possible effect of this wind reduction on evaporation is, probably, more important than the wind reduction itself, since it is by the effect on evaporation that shelterbelts can be assumed to conserve the precious moisture of a dry region.

Measurements<sup>3</sup> made in the summer, when crops were growing, showed a smaller percentage reduction in evaporation than in wind movement, for the reason that somewhat higher temperatures prevailed in the becalmed air behind the windbreaks. Since temperature and sunlight play a less important part in evaporation in the winter, the drying effect would be more nearly proportionate to the wind velocity, but, again, most windbreaks are considerably less effective in the mechanical sense when the trees are

not in foliage.

Despite the fact that Dr. Huntington strongly emphasizes the importance of shelterbelts in protecting crops against hot summer winds, it should be evident that a shelterbelt may well be conserving moisture of the soil throughout the entire year, with allowance for changing wind directions. In the Plains' region, the winter is the only likely period for moisture storage in the soil. Since, moreover, even in the moderately wet years the depth of soil wetting is usually only about three feet, it is evident that the conservation of surface moisture by any means whatsoever is critically important. If the surface is quickly dried after each snow or rain, then there is practically no opportunity for accumulation in the soil at any depth, whereas if this drying can be largely prevented, even small accretions from time to time may add measurably to safe, deep storage.

#### SOIL BLOWING

The drifting of soil, which is often very damaging in the Plains, may be affected both by the reduction of wind-velocity and by the greater retention of moisture which shelterbelts promise. It cannot be hoped to protect large fields entirely from soil movement under persistent winds, but as really massive drifting starts from foci of special exposure or weakness, it might be possible to accomplish a great deal by a study of these phenomena and an attempt to place the few shelterbelts most strategically. It is by no means a simple subject. General dust storms, moreover, are quite a sepa-

<sup>3</sup>Bulletin 86, U. S. Forest Service, 1911, *out of print*. The writer is pained to discover how many questions this publication leaves unanswered, when attempt is made to use the results quantitatively. Anyone attempting to duplicate the investigation, however, even with adequate equipment, will soon realize the difficulty of finding really good "set-ups," either as to effective windbreaks or topography which does not introduce complicating factors. See page 41 of this Bulletin for striking instance of crop being saved from wind damage.

rate problem from the type of soil movement most damaging to fields. Dust storms arise very quickly on the "front" of gales, usually of short duration, and probably are not preventable, even by the substitution of sod for plow-land.

#### SNOW DRIFTING: MOISTURE DISTRIBUTION

The effect of the becalmed air near a shelterbelt upon the drifting of snow would seem at first to be an encouragement to uneven distribution of moisture. It is, however, somewhat more than this in connection with crop-growing in the Plains. Here the snow is usually dry and light, and especially in the regularly undulating topography of the glaciated northern region there is a decided tendency for a very large part of the snow to drift into the depressions, where deep drifts may lie while the higher portions of the ground remain bare. More moisture than is needed is thus released in the depressions, and soaks away to the water-table, mostly beyond the reach of roots. This is not altogether a bad thing, because wells must be supplied from this water-table. But in the southern part of the region, where deeper dissection and surface drainage mark the topography, this excess of water goes largely to the swelling of streamflow in the spring, and is therefore lost to the local area. In either event it is lost to crops. Insofar, therefore, as shelterbelts stop snow movement upon the higher ground, permitting the snow to lodge and melt there, there is actually a more favorable distribution than before, although still uneven. Some of this snow may serve only to support the trees, and not the crops on fields adjacent. Good farmers in the Plains go to considerable trouble to prevent the "blowing away" of all the snow that falls. Stubble does not seem to be very effective in this. The favored method is

to leave the ground as rough as possible by fall plowing, a treatment which is probably as effective by preventing runoff when the snow melts as by its actual prevention of snow loss.

#### POSSIBLE INCREASE IN TOTAL MOISTURE

Up to this point we have been dealing with effect of wind reduction and decreased evaporation, especially during the period of winter moisture-storage, on the conservation of moisture, with definite *probability* of making more moisture available for crop growing. This temporary conservation does not mean any permanent hold-over or increase of moisture; it simply means that a fraction which would disappear from the region at the season when all evaporation is very low except for the effect of strong persistent winds, is carried forward into the crop season. If, then, crops have more moisture to grow upon, by their very dissipation of this excess later in the season it is conceivable that they may at that time add enough more to the local atmosphere to lengthen somewhat the rainy period. This is not material. It is hardly understandable at all except after considering carefully the character of a strictly continental climate, and the origin of its moisture supply.

Meteorologists have "hammered" so long on the idea that "all" precipitation, or a very large fraction, is derived from evaporation over the oceans, and such a small proportion from the much smaller land surface of the earth, that it is probable there has been created an erroneous conception of the importance of land evaporation in supplying the precipitation of the interior of a continent. We are dealing here with a strictly "continental" climate, far removed from the Gulf of Mexico which is commonly given as the main source of moisture supply



for the central portion of the U. S. It is a plain proposition that the amount which must be derived annually from the Ocean, if the precipitation and the general moisture of the territory remain essentially stationary from year to year, is the amount which flows back to the Ocean. Of course, this statement cannot apply literally to any given area, since moisture once evaporated may move long distances, and either the same or different moisture may drift back to the original area to be re-precipitated. But the important point is that the interior of the continent must *largely* maintain its own balance of evaporation and re-precipitation.

For the sake of clear argument, let us take a concrete example applicable to the glaciated portion of the Dakotas where the most "continental climate" prevails. There is a minimum effect of the oceans either on temperature or precipitation.

I. The total annual precipitation is 20 inches.

A. Only one inch of this returns to the sea. (Approx. 28-year record for Red River at Fargo, North Dakota.)

B. A conservative estimate of total run-off from the higher ground is 5 inches. Therefore, about 4 inches annually flows into glacial depressions and either sinks to the water-table or evaporates directly. Presumably, with this replenishment the water-table level remains stationary so that (a) the ground water either drains away to other regions,—of which there is no evidence,<sup>4</sup>—or (b) serves as a *steady supply* to replenish atmospheric moisture, being tapped to some extent by deep-rooting plants and to some extent appearing as seepage in the deeper valleys.

C. There then remains about 15 inches to *wet the surface* of upland areas in gen-

eral, and this amount does no more. Limestone deposits in the soil show that only rarely does moisture penetrate more than 2/3 feet. This entire supply then, must be re-evaporated either directly from the soil or through plants.

(In the southern part of our territory, item *A* above becomes much larger and item *B* practically disappears. The net loss to the region from run-off is, therefore, considerably greater, but the opportunity for a quick return of the loss, by Gulf winds, is also much better.)

The one inch per annum which is returned to the sea from a Dakota area is a total loss to that area. Presumably, there is nothing that can be done through human effort either to facilitate or impede the very slow process by which a similar amount is eventually returned to the region. If, however, its run-off to the streams could be entirely prevented, Dakota's quota of ocean (or Gulf) moisture would not be in the slightest degree reduced, and the additional inch *employed locally* would give all of the benefits of an increase of an inch in the precipitation, often a critical amount. We do not even need to ask the question whether, *in the use*, the ultimate re-evaporation of this moisture would actually increase local precipitation. It probably would, but there are involved here questions of *distribution* of the moisture from continental evaporation which no one, I think, is prepared to settle at all conclusively at this time. The important thing is that this inch of moisture might be used locally and that such use would certainly tend to build up the humidity of the local atmosphere. Insofar as this is done on a broad scale for the entire interior of the continent, it cannot fail to have the effect of facilitating and increasing con-

<sup>4</sup>If there is such a loss, it merely strengthens the argument for preventing run-off from the uplands.

tinental precipitation, which is very largely a question of "turn-over," and not of moisture blown in from the oceans.

Shelterbelt planting is not, primarily, proposed for the purpose of preventing run-off or of reducing that loss to the region through surface streamflow which is seen to occur. It can, however, accomplish this purpose in some degree, and if combined with direct water-conservation measures, each of minor magnitude but very widely distributed, it can accomplish a great deal toward this end. This combination is definitely *in* the plan.

### EFFECT ON CROPS

There is an obvious reason for skepticism as to the effects which the retention of moisture, through reduction of wind movement and evaporation, has upon crops. While innumerable examples of striking benefit to crops from shelterbelts have been recorded in literature and a great many cases have been brought to our attention in a less formal way, we fully realize the extreme difficulty of finding physical situations in which fair "experimental conditions" are at all well satisfied. I do not at all agree with Dr. Huntington's statement, "One of the curious features of the whole project is the apparent lack of careful statistical analysis. The necessary facts could easily be gathered." This is not "curious" considering that the Forest Service has conducted no systematic investigations along the line of these particular problems since 1908. A long-sustained study of the kind started in 1908 could have given us, over a period of years, very reliable and average information of unimpeachable conclusiveness, but perhaps not exactly applicable to the Shelterbelt Zone. Not in any short period of the past would it have been possible to obtain really reliable proof on such a matter as crop-

yield effects. Such a study will, however, be inaugurated in a very thorough manner as one of the first, and continuing, research activities under the Shelterbelt project, taking advantage of every opportunity. Its inauguration late in 1934 was impossible. What is needed for satisfying experiment and observation is an immense field laboratory with all soil conditions under control, shelterbelts built to satisfactory specifications, etc.

In view of the fact that most of the hearsay evidence on crop effects is thoroughly unreliable, it is necessary, first, to refer the reader to the findings of 1908, and then to summarize the situation by saying that if all of the cases which have been observed and reported, in which there was a noticeable crop effect in the shelter of a windbreak, could be averaged together with all the cases in which there was no noticeable effect under similar conditions, the mean result would be a very considerable item.

Dr. Huntington's figures appeal to me as a very fair guess in an attempt to rate wheat increases. In the study of 1908, mostly with corn yields, if the average increase, represented by a doubled yield over an area one to three times as wide as the height of trees, be spread over an area 20 times as wide, it means an increase of 5 per cent to 15 per cent. But if we do not include the cropland area occupied by the trees, which was "charged off" in these calculations, it is a matter of, say, 10 per cent to 25 per cent increase for the area in crop, within the limit of 20 times the height.

### IMPORTANT FEATURES OF THE PLAN

With the above view of what shelterbelt planting may hope to accomplish, from which view the many human aspects should not be lost, we may consider some rules which should govern

the planning, and distribution of shelterbelts:

1. The *area* chosen tentatively, and to be finally settled upon as soon as a thorough survey of the physical conditions can be completed is, broadly, *as far west as it is feasible to go*, because here the need is greatest. By *feasible* is, of course, meant the possibility of making trees grow to a sufficient height and density so that the physical effects of wind stoppage may be obtained in a reasonable degree. Beyond this line, whether controlled by absolute shortage of moisture or special aridity of the soils, the plan for a fairly uniform and equable distribution of the planting breaks down. While some planting might still be done in favored places, with enormous aesthetic benefit, such need hardly be considered an essential part of the present undertaking.

It is believed that the technical discussion has clearly implied what is meant by "reasonably effective" tree growth.

Even though we may, because of very unfavorable soils, be compelled to put the western limit for effective planting, in some localities, farther east than was contemplated when the line was drawn on the basis of rainfall alone, there still remains a wide zone of fairly open plains in striking contrast to the degree of planting which has been done even in the eastern parts of the same states.

2. The *distribution* of shelterbelts within the wide zone must be as even as possible if the maximum benefits are to accrue. It is also an essential of a public project that no individual or small group should benefit to the disadvantage of others. Hence the original proposal for one shelterbelt strip through each section of land. Certain particularly unfavorable soil conditions will make it necessary to "skip" certain sections, or even

larger areas, while again the prevalence of "blowing types" of soil, may lead to a concentration of shelterbelts slightly higher than normal, but always with the community interest, not that of the individual, in mind. Until the entire area has been covered in an equable manner, however, it will be well to avoid any concentration of the effort.

3. There are many possible *locations*, within a given section, or square mile, having in mind a shelterbelt length of one mile. There are 6 miles of "interior" forty lines which can be used without encroaching on the outer boundaries or immediately paralleling the roads which generally follow these boundary lines. The shelterbelt might be in one continuous line a mile long, or in four quarter-mile disconnected segments. The aggregate effect would probably be about the same in both cases. The criteria are soil conditions, property divisions, the convenient division of fields, and the direct protection of as large an acreage of plow land as possible. Pasture land is appreciably less subject to benefit.

There are, where the country is at all broken, some decided advantages in following topographic lines, keeping shelterbelts near the tops of ridges where their mechanical effects will be greatest, and where, moreover, soil conditions are less likely to be inimical. Such an arrangement also makes possible effective runoff interception and automatic irrigation of the trees. Without doubt, such arrangements can be effected where the relief is sufficient to influence the use of the land or shape of fields.

4. The *orientation* of shelterbelts should be varied, as far as possible in any locality, to break up any uninterrupted "sweep" of the wind from any direction. It is now apparent that there is no direction so completely in the ascendancy in any part of the region that all others may



be ignored. In most of the region a "quartering" orientation, from southwest to northeast, would generally give the needed opposition to both winter and summer winds, but since such a diagonal direction is probably out of the question

in most cases, the direction of axes should be about equally east-west and north-south, with the former favored in any portion of the area where the summer prevailing wind is from the south, rather than the southeast.

# FOREST PRACTICE RULES UNDER THE LUMBER CODE

By B. F. HEINTZLEMAN

*U. S. Forest Service, Washington, D. C.*

The November JOURNAL carried a statement by John B. Woods, Conservation Director under the National Lumber Code Authority, giving his viewpoint on the present status of the Forest Practice Rules. It was followed by a brief account by A. B. Recknagel, Forestry Advisor for the Northeastern Division of the Lumber Code Authority, of the situation in the Northeast. We are presenting here the Forest Service's viewpoint by B. F. Heintzleman, who heads up the conservation code work in that organization, and another contribution from the pen of A. B. Recknagel offering a plan for putting the undertaking on a permanent basis.

THE Rules of Forest Practice to be applied in each of the various divisions and districts of the Lumber Code are expected to serve as guides to better forest protection and better silviculture in the program of the organized lumber industry for placing the country's privately owned forest resources under proper management. The initial rules established by the Code agencies for this purpose on June 1, can be regarded as suitable only for a start on the project. They represent an advance over previous woods practices of many, but by no means of all, logging operators and must be strengthened in the near future and at frequent intervals if they are to bring results within a reasonable period of time.

More pressure should be applied by the Code agencies to obtain compliance in the woods with these initial rules. The progress made in getting compliance in the five months since the rules went into effect has varied widely among and within the administrative divisions and as a whole has not met the expectations of most foresters who have followed the matter. The showing for the fire protection requirements is somewhat better than for the silvicultural requirements. Observance of the latter lags everywhere even though the measures so far established are in every case quite simple. If we re-

gard the present rules as a sketch map of the road to satisfactory forestry practices then actual compliance by the operators to date consists of their lining up at the starting point and facing in the right direction while a few of the more progressive among them have taken a few steps forward.

The Code organization calls for a Director of Conservation in the office of the Lumber Code Authority at Washington; a Committee on Forest Conservation in each division with lumbermen as active members and foresters of public agencies as advisory members; Forest Practice Committees, of the same membership makeup, in each district of those divisions having districts. A division or district forest engineer and subordinates as needed, are to be employed by each committee to carry on the compliance work among the logging operators.

A technically trained forester of wide experience with lumber companies has been selected as Director of Conservation for the Code Authority. He is aggressively urging action by the division and district committees, but while these agencies almost invariably are showing great interest in the project and are active along many lines there has been delay for a variety of reasons in setting up adequate field forces for compliance work. One

reason is that the dissatisfaction that has arisen both within and without the Code ranks over certain industrial features of the Code has absorbed much of the effort of the agency officers.

The best progress in compliance has been made, of course, where organization for the field work has been expedited and the West is ahead of the East in this regard. The West Coast (Douglas fir) division leads the field with a division forest engineer and three district forest engineers employed exclusively on conservation work in its relatively small area. Western pine covering practically the entire West has a division engineer and six district forest engineers on conservation work in its seven Code Districts. Redwood has a division engineer, only. East of the Great Plains the showing is poorer. Southern pine with about 11,000 operators, or close to one-third of the total mills of the entire country, has so far employed only one man, a division engineer. The same is true of Appalachian and southern hardwood with 6000 mills. Northern pine, which covers Minnesota only, has one man. The Northern Hemlock and Hardwood Division, of Michigan and Wisconsin, and the Northeastern Division, covering New England and the Middle Atlantic States, do not yet have any compliance officers but each has recently authorized the appointment of a division engineer. The North Central Hardwood Division in the Ohio Valley, and southern cypress have no conservation officers.

The conservation personnel in all of the divisions should be enlarged materially at an early date. With 30,000 or more individual enterprises throughout the United States subject to the Forest Practice Rules, the skeleton organization now in the field is far too small to supply that personal contact with the individual woods operator which is necessary to get this new activity actually started on the

ground in a reasonable time. It is a monumental task to get this number of widely scattered concerns to coöperate in carrying out a program that is new to most of them, particularly as it sets up requirements involving expenditures which do not result in direct and relatively early financial reimbursements.

The task of carrying forward the conservation program of the industry is so great that the writer believes it will not be highly successful unless the public agencies, federal and state, take a much more active part than they are now taking in the project. Under the present scheme of Lumber Code organization this help would have to come principally from the federal government. The effort to educate the many operators in the required forestry measures, to obtain full and universal application of the Forest Practice Rules and to get improvements made in the rules at frequent intervals will prove a heavy load even for the combined federal, state and Lumber Code forces. Along with this great effort to obtain continuous forest productivity through satisfactory compliance with Forest Practice Rules the industry has the larger problem of placing its operations on a basis of sustained production to provide stability to labor, communities and investments, and thus achieve the principal objective of the National Recovery Act under which the Lumber Code was established.

Material assistance has been offered to date by the federal government toward the development under the Code of better forestry practices. The research and administrative units of the Forest Service participated in an advisory capacity when the rules for the various divisions and districts were formulated, and continue to act in the same capacity on the division and district committees. The Forest Service Branch of Research is conducting important field studies designed to further



the work of the Code agencies. Each regional office of the Forest Service has detailed a small force of well trained men to offer assistance to the committees and compliance forces of the Code agencies in solving administrative problems which arise. These men are also investigating and reporting on possibilities for blocking up sustained yield units among the holdings of operators.

The federal government has delegated to the Lumber Code agencies important powers which were previously considered as strictly governmental functions and the government is entitled to know what is being done under this new system. This is as true of the conservation provisions as of the other articles of the Code and the Chief Forester of the Forest Service has thus been designated an administration member of the Lumber Code Authority. This position requires that he have information on the forestry activities of the Code agencies and such information can only be acquired by observation or inspection in the field. A limited amount of that kind of work is therefore being done for the Chief Forester by qualified members of the forest code staff of each regional office.

The general opinion among lumbermen and foresters is that the Lumber Code will be continued in some form after June 16, 1935, the date when NIRA is scheduled to end, and that the government will insist on the retention of forest conservation features. In any event it is generally accepted that some public requirements to insure continued productivity of the forests will hereafter have to be met by the industry. Perhaps many of the lumbermen would object to a return to the old practices. The practice of forestry would doubtless be advanced materially if the federal government should make provision for a general forest conservation code applicable to all commercial forest lands, and tied to the man-

agement of the land rather than merely to the logging operations, as is now the case with the Lumber Code. Obviously it is absurd to require an operator for sawlogs to leave a cutting area in good shape for further growth and reproduction, and then take no action to prevent the land owner from wrecking the residual stand through poor fire protection or uncontrolled cutting for other classes of products. A reasonable degree of regulation over the volume output from the forests of a given social unit, such as a county, should also be provided to promote local sustained yield as a basis for providing both regularity of employment and permanency of dependent communities and forest industries.

#### FOREST SERVICE PERSONNEL ON CODE WORK

The administrative division of the Forest Service is building up a small force of trained foresters in the Washington and regional offices of Forest Management to give advice and assistance on the problems encountered by the various code agencies which have or will have conservation requirements to administer. The codes affected are those for the lumber, pulpwood, hardwood distillation and the marketing agreement under the AAA of the gum turpentine producers.

The following men have so far been placed on this work:

*Washington Office:* B. F. Heintzleman, in charge; Perkins Coville, Assistant.

*Region 1, (Northern):* Philip Neff, Logging Engineer.

*Region 5, (California):* M. M. Barnum, Forest Code Examiner; A. B. Everts, Associate Forest Code Examiner.

*Region 6, (North Pacific):* B. E. Hoffman, Senior Forest Inspector (Sustained Yield studies); W. B. Osborne, Senior Forest Code Inspector; N. J. Wright, Senior Forest Code Examiner; R. F. Grefe,

Forest Code Examiner (Sustained Yield studies); I. J. Mason, Forest Code Examiner (Sustained Yield studies); C. Waterbury, Forest Code Examiner; E. J. Hanzlik, Forest Examiner.

*Region 8, (Southern):* E. J. Schlatter, Forest Inspector; D. R. Brewster, Senior Forest Code Examiner; E. W. Hadley, Senior Forest Code Examiner.

*Region 9, (North Central):* Gerald

Cook, Associate Conservationist; C. B. Stott, Associate Forest Code Examiner.

In the regional offices the Code personnel functions under the general supervision of the Assistant Regional Forester in charge of forest management.

The number of persons is to be increased from time to time with early additions contemplated to provide coöperation in the Eastern Region.

## OPEN MEMORANDUM FOR THE JOINT COMMITTEE<sup>1</sup>

By A. B. RECKNAGEL

*Dept. of Forestry, Cornell University*

IT IS increasingly evident that unless immediate steps are taken, the progress made to date under the Forest Practice Rules and the Conservation Code, may be lost. With the future of N.R.A. shrouded in doubt and obscurity, one thing is clear: the conservation provisions of the Code must be salvaged and made a *permanent* part of our national economy. The alternative is complete governmental control of all private timber operations.

The great weakness of the Conservation Code is that it is an appendage to a manufacturers' code. Its strength is that it recognizes the values inherent in an undertaking in industrial self-government.

The Conservation Code must, to be fully effective, go back to the *source* of the industry's raw material—the *timberland* and to do this it must be binding upon all timberland owners.

To bring this about, two courses are open: *one*, by Congressional action establishing a federal conservation code, with appropriate control of its enforcement; *two*, by voluntary action on the part of the forest industries and timberland own-

ers themselves, through development and expansion of the existing machinery.

Of these two courses, the latter is preferable. It can be brought about as follows:

In each of the ten division or subdivision administrative agencies under the Lumber Code concerned with Forest Practice Rules, there is now functioning a Division Committee on Conservation. The chairmen of these ten division committees, plus the Director of Conservation of the National Lumber Manufacturers' Association, would constitute the *National Committee on Conservation*. Sitting with this Committee but having no vote thereon, would be three (3) government representatives and three (3) public representatives to be appointed by the President upon recommendation of the Secretary of Agriculture.

Members of the National Committee on Conservation would be entitled to receive their necessary travel expenses from a special fund, sufficient for that purpose, and levied against the timberland owners in the respective divisions.

The National Committee would regularly meet each quarter as follows:

<sup>1</sup>Appointed to give effect to the Recommendations of the Conferences held under Article X of the Lumber Code in Washington, D. C., October 1933 and January 1934.

One meeting in the Northeast or in Washington (January); One meeting in the Southeast (April); One meeting in the Lake States (July); One meeting in the Pacific Coast (October).

Special meetings would be called as exigencies required.

The Committee would organize itself by electing a chairman for the calendar year and appointing a secretary who would, besides his expenses, receive such stipend as the Committee might decide.

Within the geographic provinces as now outlined under the Lumber Code, the existing division committees on conservation would continue to function *regionally* as now, but with this important addition:

Effective July 1, 1935 the division committee would cease to be subordinate to the various division administrative agencies of the Lumber Code and would become *autonomous*, representing all timberland owners within that region whether operators or non-operators.

There would thus be created a *Regional Association of Timberland Owners* which would meet annually for the purpose of choosing the Division Committee on Conservation, deciding on its budget and transacting such other necessary business as would come before it. The organization meeting would be called by the existing Division Committee and thereafter the Regional Association would be a self-governing body.

In all other respects, particularly as regards the existing forest practice rules,

the present set-up would be left undisturbed. In the matter of *finances* the Regional Association would determine its necessary expenses and levy an assessment against its constituent timberland owning members—a fraction of a cent an acre should suffice.

All woodlot owners would be welcomed into regional association membership. No owner of less than 500 acres would be entitled to a vote greater than the fraction which his holding represents of said 500 acres.

The Regional Association would have as its executive body the Division Committee on Conservation for that region.

To carry out the provisions set forth above on 508,600,000 acres of privately owned timberland, requires on the part of the individual owners a high degree of coöperation. This can best be achieved by appropriate literature and radio addresses. It is a movement which should be sponsored by no less an authority than the President of the United States and backed up by all associations and groups in interest, particularly the various forest products manufacturers' associations, the American Forestry Association, the American Tree Association, the Society of American Foresters, etc. The goal is improved forest management through self government of timberland owners. The alternative is autocratic, regulatory control imposed on the owners by federal and state authority. Between these two the timberland owner must choose—now!



# THE RANGE AND IMPORTANCE OF NECTRIA CANKER ON HARDWOODS IN THE NORTHEAST

By D. S. WELCH

*Cornell University*

Studies on the diseases of young hardwoods have been almost entirely neglected in spite of the fact that an ever increasing part of our forest area is rapidly being converted into this type of stand. The distinction between desirable and undesirable species has been drawn to a large extent on the basis of the prospective value of the wood produced, with less attention paid to the possibility of diseases. The existence of diseases of the type which injure the form and quality of the growing tree without destroying it completely introduces a hazard which has not been fully appreciated by many silviculturists.

RECENT activities in certain lines of forestry endeavor have focused attention on the stands of young hardwoods which make up such a large proportion of the forest areas in the northeastern United States. These immature stands represent the vestige of once valuable forests and the processes by which they have been reduced to their present state are too well known to require elaboration here. It is sufficient to note that repeated cutting of the more valuable trees, often augmented by subsequent burning of the areas, has led to the present condition. The result is an ill-assorted mixture of species and ages, often with a great proportion of weed trees.

While it is very difficult, if not actually impossible, to evaluate the future significance of these young forests it is obvious that they will have some value and anything which may influence their development for the better may be the deciding factor in their ultimate usefulness. They present a very real problem to the federal, state or private agency into whose keeping they have fallen. Their poor quality and variable and frequently undesirable composition render them difficult subjects for treatment so that the forester who is expected to carry on stand improvement in such areas is faced with

several difficult propositions, not the least of which is the question of disease.

It has been assumed that the major problems in the improvement of these young stands were to be found in the selection of desirable species for the future crop and in the creation of a suitable environment for their development. On this basis some work has already been undertaken in research and demonstration forests. The results of these attempts have in some respects been disappointing and this has been due in no small measure to disregard of the factor of disease in the development of the young tree. Studies on the diseases of young hardwoods have been almost entirely neglected in spite of the fact that an ever increasing part of our forest area is rapidly being converted into this type of stand. The distinction between desirable and undesirable species has been drawn to a large extent on the basis of the prospective value of the wood produced, with less attention paid to the possibility of diseases. The existence of diseases of the type which injure the form and quality of the growing tree without destroying it completely introduces a hazard which has not been fully appreciated by many silviculturists.

By far the most important of such diseases of hardwoods are the so-called

Nectria cankers. These are fungous infections of the cortex and cambium region, generally localized in relatively small areas on the trunk and spreading very slowly from year to year. The characteristic appearance of such a canker on paper birch is illustrated in Figure 1. The invasion of the tissues is of the type which has been described as intermittent, due to the fact that the progress of the diseases is not continuous. Each year the cambium at the margin of the canker forms a new callus which is subsequently killed by the fungus. The parasite in the meantime has remained in an inactive state in the outer layers of the cortex adjacent to the newly developing callus. This process is repeated year after year so that there is produced a series of dead callus folds arranged in a concentric manner around the point of original infection. Occasionally part of the callus is not killed for several



FIG. 1.—A typical *Nectria* canker on the main stem of a young paper birch.

years so that there is partial healing of the wound, giving an irregular outline to the canker. Complete healing sometimes occurs, the diseased bark becoming entirely occluded.

At certain times during the year, notably early spring and late fall, the small scarlet fruiting bodies or perithecia of the *Nectria* fungus can usually be found on the recently killed bark near the margin of the cankers. In all cases of the disease discussed in this paper the fungus is of the type commonly referred to as *Nectria ditissima* Tul. or *N. galligena* Bres., having smooth perithecia in clusters on a stromatic base and preceded in development by an inconspicuous imperfect stage belonging to the genus *Cylindrocarpon* Wr. It should be noted that another less important group of canker diseases of woody plants is caused by *Nectria cinnabarina* Fr. having rough perithecia, light red or pinkish in color, with a conspicuous imperfect stage belonging to the genus *Tubercularia* Tode. The symptoms of the disease caused by *Nectria cinnabarina* are quite different from those described above and the disease is of relatively little importance.

The proof of the causal relation of *Nectria* to the disease does not rest alone on the evidence of its association with these lesions. Numerous successful inoculations have been reported both in this country (1, 2, 4, 12) and in Europe (8, 14).

The shape and general appearance of the cankers vary greatly with the host tree, due primarily to differences in the nature of the bark. For example, the lesion on basswood is usually regular, symmetrical, elongate and pointed at the ends, because of the ease with which the bark of that tree is split longitudinally. The canker on yellow birch, on the other hand, is frequently almost circular in outline, with the tough outer bark persisting for several years; resisting the

pressure of growth from the sides and obscuring the lesion beneath. Cankers on the oaks are usually extremely irregular, often resembling injuries from fence wires by being longest in the horizontal direction.

Insects are frequently found associated with these cankers. In some cases they may appear to be the primary agent, but an analysis of the development of the lesion which may be made from a study of the growth rings will usually reveal that the insects which are present have followed the fungus infection. A possible exception to this is the occurrence of the fungus in association with the maple Sesian borer (*Synanthedon acer-nia* Clem.). This insect is said to be able to produce gall-like cankers, particularly on the soft maples. The agency of the insect in producing the canker-like formation can hardly be denied, but since the *Nectria* fungus is also present in a great majority of cases it may be concluded that the fungus at least plays a partial rôle in the production of the canker.

*Nectria* cankers are extremely frequent in their occurrence, having been found on nearly every species of hardwood tree and on many of the larger shrubs in the Northeast. The genera upon which *Nectria* cankers are known to occur in the northeastern United States include *Acer*, *Amelanchier*, *Betula*, *Carpinus*, *Carya*, *Corylus*, *Fagus*, *Fraxinus*, *Juglans*, *Liriodendron*, *Malus*, *Nyssa*, *Ostrya*, *Populus*, *Prunus*, *Quercus*, *Rhus*, *Sassafras*, *Tilia* and *Ulmus*. Extended lists giving the species in these genera which have been found to be attacked have been published elsewhere (3, 13). Such a common phenomenon has not escaped the notice of foresters, many of whom, having seen the cankers, dismissed them as wounds which would soon heal. This is not to be wondered at, since the young cankers bear a close resemblance to healing

wounds of a mechanical origin.

The geographic range of *Nectria* canker in the northeastern states appears to coincide with the range of the host trees upon which it is found. Evidence of its ubiquitous nature has been accumulated by the author from about 70 forested areas in New England and New York. These include the central Adirondack region (Hamilton and Essex counties), central New York (Schuyler, Tompkins and Wayne counties), and numerous scattered points in all of the New England states except Rhode Island. Studies on the disease in New York have been carried on during the years 1927 to 1933. The observations in New England were made during the summer and fall of 1933 while the author was engaged in Emergency Conservation Work in coöperation with the technical staffs of the Civilian Conservation Corps camps. In conjunction with these activities a general forest disease survey was made in portions of practically every important forested region in New England except northern Maine.

The importance of *Nectria* cankers on both fruit and forest trees has been recognized in Europe, as is shown by the voluminous literature on the subject (5, 6, 7, 8). Isolated reports have appeared from time to time in this country (1, 2, 3, 4, 9, 10, 11, 12). These have dealt mostly with the disease on individual species, and in no case has the attention of foresters been specifically called to the significance of the disease as it relates to the growing of young hardwoods.

The damage from *Nectria* canker may vary greatly in different stands. Sometimes cankered trees are rare, while at other times 60 to 80 per cent of the trees of a single species may be so badly damaged that they are obviously not to be depended upon as crop trees. Such severe injury has been observed in red and black oak (Connecticut), yellow and



black birch (Vermont), paper birch (New Hampshire), and basswood (New York). An example of the extreme form which the damage may assume is to be seen near the highway at the famous Profile in Franconia Notch, N. H. The yellow birches which are the dominating trees in the grove by the lake, a spot visited by hundreds of tourists every year, are in a rapidly declining condition due to the numerous *Nectria* cankers on their trunks.

Trees attacked by *Nectria* canker are rarely killed outright. The initial lesions are small and spread of the infection takes place slowly, often less than  $\frac{1}{2}$  inch a year. At this rate the danger of killing by girdling is not very great. The chief menace to the welfare of the tree lies in the fact that an open wound is created, often leading directly into the heartwood by way of a dead branch trace. Insects and wood destroying fungi find such a place very suitable for their development and the tree may ultimately die or be windthrown because of mechanical weakening at the point of attack. Even if the fungus dies, as sometimes happens, and the lesion heals over, there remains a serious defect in the wood consisting of the old scar and accompanying callus. Healing may not have taken place until after heart rot has become established, in which case the subsequent sealing of the aperture has little or no effect on the development of the rot. Affected trees may persist for a very long time and have little or no value when they reach maturity. The cankers usually become established on the main stem when the trees are young so that they are present on the trunk of older trees in such a position that they impair the value of the larger logs. In addition to their direct damaging effect the cankers also serve as a source of danger to nearby trees, since spores produced on or near the lesions are blown by the wind

to neighboring trees where new infections become established.

Regarding the silvicultural treatment of cankered trees there is little experimental evidence applicable to American conditions. An obvious means of decreasing the damage is to remove affected trees from the stand during weeding or thinning operations. It is known that the fungus has a tendency to fruit abundantly for one or two seasons on cankered trunks which have been felled and left under moist conditions in contact with the ground. This would appear to be an undesirable practice since it would serve to increase the danger of new infections in two possible ways, first by the increased production of spores (inoculum) and second, by injury to the surrounding trunks in the felling, resulting in increased chances for inoculation.

In a study of *Nectria* canker on basswood in New York the saprophytic development of the fungus has been of considerable practical interest, since thinning operations are considered an essential practice in the woodlands where the affected trees are growing. A series of experiments were conducted by the author to show the relation which might exist between the time of cutting of a diseased tree and the subsequent development of the fungus. In each month of the year two or more trees bearing numerous cankers were felled and left lying flat on the ground. The branches were all removed and the trunks were cut into sections, usually 8 to 10 feet in length, which would permit the logs to lie in contact with the ground throughout their entire length. Twenty-seven trees were thus eventually felled. They bore a total of over 400 cankers. Monthly observations on the development of fruiting stages were taken over a period of 42 months, with the exception of an occasional month in midwinter when the trunks were covered with snow. From

the data thus obtained the following generalizations may be made.

The fungus may be expected to fruit abundantly on cankered trunks in contact with the ground sometime within a period of 4 to 30 months after cutting. Severed limbs bearing no cankers remain free from the fungus. The time of cutting has no relation to the number of perithecia eventually produced, but trees cut in December or January produce few perithecia during the following summer, the major development being delayed until the second season after cutting. Trees cut in June or July bear a large crop of perithecia within 4 months. The saprophytic development may involve large areas of the trunk since the fungus spreads for several feet out from the cankered regions into the bark. The number of perithecia formed may be very great, thousands of them occurring in dense masses so closely crowded as to interfere with their own development. By comparisons of morphological and cultural characters and by inoculation experiments, the author has determined that the fungus found growing as a saprophyte on dead trees is identical with the one found fruiting sparingly on active cankers. While the greatest development takes place during the spring, perithecia bearing viable spores have been collected every month during the year. By cutting away the perithecia as soon as they mature it has been possible to develop three generations of fruiting bodies on the same log within a period of 31 months. It may therefore be concluded that the leaving of infected trees on moist ground is a hazardous practice in that it encourages the production of great quantities of spores capable of initiating infections in nearby trees.

#### SUMMARY

Nectria canker is a little known and

very destructive fungous disease attacking practically all species of hardwoods in the Northeast. It is present there to some degree in most if not all of the important forested areas. The disease is found commonly on young trees where it may be easily overlooked on account of its inconspicuous appearance and slow development. It is not uncommon to find over 50 per cent of the trees in an immature stand affected with the cankers, making them of doubtful value as crop trees. The fungus has been shown to be able to develop spores abundantly on cankered trunks which have been cut and left in contact with the ground. An understanding of this disease is essential to the intelligent application of silviculture to young hardwoods in the Northeast.

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# EXPERIMENTS IN SIMPLIFIED CONTROL OF MOUND-BUILDING ANTS IN THE FOREST

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The financial factor is of great importance to the private owner in the consideration of forest insect control. The authors demonstrate simple and inexpensive methods for controlling the mound-building ant. Mounds should be treated when they are small. Treatment, with commercial carbon disulphide or ethylene dichloride, should be carried out in the late fall when seasonal activity has ceased or in the summer during periods of high humidity and low atmospheric pressure when most of the ants will be in the mound.

THE death of young coniferous trees, in both natural stands and plantations, in areas surrounding nests of the mound-building ant of the Alleghenies (*Formica exsectoides* Forel) was the subject of considerable discussion among foresters 15 to 20 years ago. In the JOURNAL OF FORESTRY for April, 1922, (Volume 20, No. 4, pp. 325-336), H. B. Peirson discussed this problem in detail, gave an historical account of the research done by previous writers, and showed the manner in which the trees were killed. It was definitely shown at that time that where the ants had gnawed the bark at the base of the tree formic acid had been injected into the wounds. The principal cell contents became coagulated, the flow of sap was prevented, and death of the trees followed eventually.

During the course of his investigation Peirson also carried on control experiments. He found that fumigation with carbon disulphide, which produces a gas heavier than air, was the most satisfactory means of control. The procedure he advised as being most effective was to pour from 1 to 1½ pounds of the fumigant into a depression at the top of the nest, cover the depression with a large dishpan or washtub placed bottom up, and then cover the rest of the mound with sod or earth. This would prevent

the escape of the gas and would aid in keeping the ants in the nest. The method has proved very satisfactory on small or medium-sized mounds, but on a large mound, which may actually be two mounds grown together and which may be 8 to 10 feet in diameter, it is obvious that a simpler method would be desirable. It is also apparent that where a large number of mounds are to be treated, the item of dishpans or washtubs would entail considerable expense.

C. A. Coover, in *Forest Leaves* for April, 1930 (Volume 22, No. 8, pp. 119-120), stated that piling brush on a mound, thereby causing a dense shade that kills the ants or causes their migration to another nest, had proved effective in Pennsylvania. It appeared to the authors that with this method there would be nothing to prevent migration and the construction of a new nest, perhaps within a few feet of the old one, as this actually happened in some of the mounds, treated in the course of this study, in which the ants were not killed outright. Coover also reported that satisfactory control was obtained by digging out the mounds late in the fall and scattering the contents, exposing all stages of the ants, at a time when they are inactive, to lethal low temperatures. In districts, such as that of central Massachusetts,

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where there are many boulders and rocks in the subsoil, digging to a depth of perhaps 4 or 5 feet, to insure destruction of the queen, would often be extremely difficult, time-consuming, and therefore expensive.

With the primary idea of developing a simpler method of applying a fumigant than that mentioned by Peirson, the writers began a series of experiments in the summer of 1930 at the Harvard Forest, Petersham, Mass. At the time it was considered inadvisable to use poisons, such as thallium sulphate, as a base for baits because of the rather stringent regulations in Massachusetts against their use and because of the expense that would be necessary in order to comply with the law, which specifies that poison must be covered in such a way as to keep out animals.<sup>3</sup> Important considerations were the elimination of carriage of extra supplies of heavy or cumbersome equipment and the necessity for keeping the cost of destroying a mound at the lowest possible figure. Although it was definitely known that carbon disulphide was very satisfactory, but expensive if purchased in small quantities, it was decided to carry on experiments with this material as well as with others.

In considering the problem of a simplified measure of control two factors presented themselves: (1) The queen ant remains at the bottom of the nest, and a fumigant, in order to kill her, must be heavier than air, must reach the lowest confines of the nest, and must be lasting; or, if lighter than air, the lethal effect must be immediate. (2) On warm days, particularly, many of the worker ants are absent foraging or are in the upper layers of the mound at the periphery, where most of the entrance tunnels are found. The experiments have indicated that if all of the workers are not killed and if

some of the winged males and females survive, these may migrate with the workers that were absent at the time of fumigation and may form a new nest, perhaps only a few feet from the old one. In central New England the winged forms of both sexes are active in July and early August, and mounds should be treated at a time when these forms are most apt to be in the nest.

In August, 1930, 7 mounds were treated with carbon disulphide (chemically pure) and 2 were treated with a fine granular calcium cyanide. The latter 2 mounds, with dosages of 4 ounces placed in drilled holes and then tamped with earth, were but slightly affected, only a few ants being killed in each mound. All the colonies treated with carbon disulphide were killed or weakened to such an extent that they were "depauperized." In all of them there was a little activity several days after the treatment, but it is believed that this was due to returning workers that were absent at the time of fumigation. These ants were crawling around rather aimlessly, not with their usual busy activity. In 3 of the mounds a variation of the method advised by Peirson was followed, damp leaf mold and moss covered by burlap being used with dosages of  $1\frac{1}{4}$ ,  $1\frac{1}{2}$ , and  $1\frac{3}{4}$  pounds of carbon disulphide. The other 4 mounds had holes punched in them from the margin obliquely toward the center so that they converged toward the bottom. One and one-half pounds of carbon disulphide was then poured down the holes and a lighted match dropped in one of them. A muffled explosion took place immediately and the burning carbon disulphide caused the liberation of sulphur dioxide. The fumes were so strong that it was necessary for the operator to withdraw some distance from the mound. There was every indication that the ants in the "fired"

<sup>3</sup>The ruffed grouse, for example, is said to feed on ant larvae and also uses the mounds for dusting. In some cases a reasonable number of mounds might be considered of value in the forest.

mounds were killed more quickly than in the mounds not so treated, and the odor of sulphur dioxide was perceptible several days afterward. It is doubtful, however, whether, in view of the fire hazard, this extra step is advisable, especially if the litter and ground cover are dry.

About the middle of October, 1931, 10 mounds were treated with paradichlorobenzene crystals, 2-ounce lots being placed in 6 of them and 1-ounce lots in the remaining 4. Holes were bored to the solid earth or rock at the bottom of the nests and the crystals poured in. The holes were then filled with earth and it was tamped. In April, 1932, the mounds were examined and, although even then there was a perceptible odor of the chemical, the ants in all of them were active.

In June, 1932, additional experiments were initiated with commercial carbon disulphide and a relatively new material, ethylene dichloride. The latter is nearly as volatile as carbon disulphide, produces a gas heavier than air, is noninflammable, and has no dangerous or harmful effects on the human system as accidentally breathed by the operator in handling; whereas the mixture of carbon disulphide vapor and air is highly poisonous, as well as inflammable, and its inhalation must be guarded against as much as possible because of its effect upon heart action. The commercial grade of the latter chemical was used because of its relative cheapness, as compared with the chemically pure product.

In outlining the procedure for these new experiments it was decided to punch the holes at the margins as well as at the center, and also, in some cases, to scrape away the top of the mound and to replace it and tamp down the earth after the fumigant was applied. This, it was believed, would obviate the necessity of using extra material, such as burlap or a dishpan and sod, for covering the mounds after treatment.

Eleven mounds were treated in the early

part of June with different quantities of carbon disulphide in an attempt to determine the minimum lethal quantity necessary for a mound of given size. In all of the mounds holes were punched at the center or at the margin, or both. One very active medium-sized colony treated through both marginal and central holes on a rainy, foggy day was destroyed with 1 pound of carbon disulphide. Two other colonies in small mounds, less than 18 inches in diameter, treated in the late afternoon of a clear day, also succumbed to a dose of 1 pound each. Seven medium-sized mounds of the remaining 8 required a second application for their destruction. In 2 of these the top was removed, the liquid poured into the holes, and the material replaced and tamped. The eighth, a very large mound, really 2 that had grown together and about 10 feet in diameter at the widest part, resisted three doses of 2, 3 and 3 pounds to destroy it, but in the spring of 1933 it appeared to be weakened.

Later in the month 7 mounds were treated with ethylene dichloride, somewhat the same procedure being followed as with the carbon disulphide. Two small colonies were destroyed with one application of a half pound each; 3 medium-sized colonies succumbed to doses of 1 pound each; and 2 large mounds, one having an original application of 1 pound and the other of 2 pounds, required a second application of 2 pounds each. In one mound, which had the top raked off and the material replaced after the liquid had been poured into the holes, the ants apparently were killed more quickly than in the others.

In order to determine the effect of fall fumigation with these two chemicals, 15 mounds were treated in the early part of November, after heavy frosts had caused the cessation of seasonal activity and the workers were well down in the mounds. Four of the mounds were treated with carbon disulphide and 11 with ethylene



dichloride, in lots of 1 and 2 pounds of either. Three methods were used with each fumigant: (1) Simply removing the top material to a depth of about 6 or 8 inches, pouring the liquid in the depression, and then replacing and tamping the material; (2) removing the top material, punching one central hole and several marginal holes deep into the nest, pouring the fumigant into the holes, and then replacing and tamping the top material; (3) the same as method 2, but without removing the top material. The carbon disulphide killed the ants in all cases. In the 6 mounds treated with ethylene dichloride by the first method all the ants were active, at least at the margins. Of 3 mounds treated by the second method the ants in two were dead and those in the third were feebly active. The ants in both mounds treated by the third method were dead when the examination was made early in June, 1933.

Because of the extended period of time that elapses before most forest crops can be harvested and because of the small margin of profit that ensues, the cost of any materials used in insect control and the amount and cost of labor necessary in applying them must be given serious consideration. The applications of chemically pure carbon disulphide in 1930 were expensive, as the material cost nearly 50 cents a pound. The commercial product used in 1932 was purchased in a 25-pound drum for approximately 10 cents a pound, and the ethylene dichloride was purchased in a 50-pound can for slightly less than 10 cents a pound. These figures are not excessive and ensure relatively cheap control.

### CONCLUSIONS

The results of the experiments conducted over a period of 3 years are as follows:

Carbon disulphide or ethylene dichloride, if properly used, will control the mound-building ant (*Formica exsectoides*

Forel). Both of these chemicals volatilize quickly and produce gases heavier than air.

The quantity of carbon disulphide or ethylene dichloride to be used will be governed primarily by the size of the mound. A dosage of 1 pound (approximately 1 pint) will be sufficient for a small mound, less than 18 inches in diameter. For a medium-sized mound, less than 2½ feet in diameter, 2 pounds should be used. A large mound may need two or more applications of 2 pounds each.

Ignition of the mounds after carbon disulphide has been poured into the holes has a quick lethal effect due to the liberation of sulphur dioxide, but this additional measure is not generally advised because of the fire hazard and also because carbon disulphide itself volatilizes quickly and forms a poisonous gas.

Fumigation late in the fall, after seasonal activity has ceased, or early in the spring, before it has been resumed, will be most successful because all the ants are then present in the mound. The best time to treat a mound in the summer is during a period of high humidity and low atmospheric pressure when most of the ants will be in the mound and the gas will be kept in the tunnels for a long time. Obviously mounds should be treated when they are small.

The most satisfactory method of killing the ants in a mound is as follows: Remove several inches of the top material and punch one hole deep in the center and several holes on the periphery; after pouring the liquid in the holes, replace the top material and tamp it firmly. It is obvious that a sufficient quantity of liquid to evaporate and kill the ants at the top of the mound will be spilled around the orifice of each hole.

Paradichlorobenzene and granular calcium cyanide were not effective when placed in drilled holes and then tamped.

A lighter-than-air gas, in order to be effective, must kill the ants quickly.

# INTEGRATING FORESTRY AND GAME MANAGEMENT IN EROSION CONTROL<sup>1</sup>

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Mr. Holt has stated a first principle in the subject of integrating forestry and game management or other uses when he stresses the importance of scientists in different fields getting together and working together and in this way developing an appreciation each of the other's problem. Integration implies team work, as he suggests. Given that, with thought to ways and means of accomplishing the principal objective, for instance prevention of soil erosion by making provision for food and wild life cover, we more or less automatically arrive at coördinate or related objectives.

IT IS hardly necessary to say that I have no sympathy with any type of management that includes in its vocabulary the word "vermin." It is conceivable that cases might arise where some degree of predator control would be advisable as a purely temporary expedient—as a sop to human economics—but it should be so recognized. The man who thinks of game management as systematized predator control (one might better say "extirpation," for that is the end sought, whether admitted or not) manifests little understanding of biologic fundamentals. I dwell upon this because of the existence of certain literature that is widely circulated in the name of game management.

Fortunately, most of the literature of game management, and there is getting to be quite a lot of it despite the newness of the general acceptance of the idea, is definitely constructive.

But don't let it bluff you, as it did me when I first stumbled over Leopold's charts and graphs and King's proud word, "juxtaposition." (I am still a little hazy about that juxtaposition.) There is really nothing occult about game management. In fact, some of the literature reminds me of a definition of ecology giv-

en by an old naturalist many years ago when that so-called science was in its swaddling clothes. He called it an elaboration of the obvious!

That may be a little strong, but I am still unwilling to grant to ecology the rank of a separate science. How can anyone consider a living organism apart from its environment? When I think of a snowy egret, the background of coffee-colored water and moss-draped cypresses is almost as distinct as the bird itself; at the mention of kangaroo rats, a picture of creosote bush and desert sand flashes before my mind's eye.

So I would also deflate game management just a little. I do not imply that it is unscientific; I merely deny it the rank of a science. Game research is scientific investigation of the strictest order. Game management is—or should be—the practice of common horse sense.

When you ride out tomorrow over some of the ridges draining into Coon Creek and see the whole countryside skinned off as clean as a ballroom floor you won't need a graph to tell you why there are no quail. And were you to go down into the valley and find a handful of empty shotgun shells instead of the usual covey in a certain thicket, you wouldn't have

<sup>1</sup>Presented at the meeting of the Minnesota Section, Society of American Foresters, La Crosse, Wisconsin, April 14, 1934.

to run to the books to learn that your "vermin" walked on their hind legs.

My thesis is that, given the proper biological background and a genuine interest in the welfare of wild-life, any intelligent person should be able to accomplish a great deal towards wild-life encouragement. Certainly highly trained and eminently practical men like foresters offer especially favorable personnel for spreading the good word of wild-life restoration.

This introduction is both rambling and top-heavy, but I want to make it plain that the game management I am talking about is not an abstruse science nor is it a campaign against predators. If any large parts of this country of ours are to be made again habitable for wild-life, most of the necessary environmental manipulations will have to be made by the same common people who laid them waste in the first place. Those people aren't going to read treatises nor conduct experiments, so we must talk their language and tell them things to do that they can see some sense in.

Now as for the integration of forestry and wild-life encouragement with erosion control, I am moved to suggest that erosion may turn out to be one of those blessings in disguise that we hear so much about. If erosion drives us to be a little more careful about the uses to which we put our heritage of land, then some of the mud that has darkened the Mississippi has not gone down to sea in vain.

The fight against the common cause of erosion, as yet hardly begun, is already bringing together men who heretofore thought they had little in common. Their essential interests are now found to be much the same.

Take fire, for example. Here the interests of the forester, the erosion specialist, and the game manager are identical. This is so obvious that elaboration would

be superfluous, for it is clear that any agency that destroys the vegetation covering the soil defeats the ends of all three.

Common forestry practice directed towards the prevention of devastating fires might well be turned to the advantage of game, and without violating any principle of erosion control. I refer to the establishment of fire lanes. These lanes furnish just the openings in heavy forest that are demanded by game, and they can easily be made to yield an important game food supply without lessening their protective value.

In the stabilization of gullies, plant species may often be selected to serve the purposes of game food and cover as well as erosion control, and in some instances at least, timber production. Even the planting of strictly timber species may often be made to benefit game; while in the South it is a timber species that can always be counted on to get a foothold on badly eroded land.

Such examples could be multiplied many times, but this is hardly the occasion to present a catalogue of methods. These will vary from place to place just as widely as soil types and native species vary.

The proposition I do wish to present is that there is every reason why we can work together to better advantage than separately. It is hardly to be expected of the forester to know the food preferences and life histories of the several game species inhabiting his forest any more than it could be expected of the game man to estimate timber yields or the erosion specialist to run a nursery. But put the three together on a job and you have a real team. We feel this so strongly that in our Service, forestry and game are sometimes made the responsibility of the same man.

You foresters are already practicing erosion control; and it is indicative of



your attitude towards wild-life that you yourselves have suggested that the highest usefulness of your forests may not be the production of saw-logs. Now if we can only get the farmers to look upon their farms as something besides mere ma-

chines for turning out the maximum number of bushels of corn or pounds of tobacco, the condition of upland game will be immeasurably improved and the silt load of our streams materially lessened.



### VAST STAND OF BURNED TIMBER MAY BE SALVAGED

Encouraging reports regarding the salvaging of the immense stand of Douglas fir, cedar and hemlock timber which was burned over in the 300,000-acre Tillamook holocaust of 1933 have been received by the National Lumber Manufacturers Association. Operations are being pushed by a new logging organization, formed expressly for salvage purposes by several of the principal owners of the burned timber, and local authorities of Tillamook and Washington counties, Oregon, are coöperating with the construction of a bridge and some additional roads, while the Bureau of Public Roads has allocated additional funds for the extension of one important highway into the timber.

The coöperative logging outfit is planning to transport caterpillar tractors and a power shovel overland into the area to be tapped, and will start immediately on the construction of a railroad from that end. The great bulk of the 11,000,000,000 feet of timber burned over, is worthy of salvage. Some very good logs have already been taken from the south end of the burn and disposed of in the Columbia River markets. In allocating production permits, the Lumber Code Authority has made especial allotments to enable loggers to push salvage operations.

The fight to save this large body of timber will develop into a race between loggers and a species of beetle, or borer, which has frequently appeared in fire-killed timber in the past, riddling trunks that otherwise would have remained sound for more than a century. Possible methods for combatting the activities of this pest, should it make its appearance in the burned area, are now being studied by the Bureau of Entomology of the U. S. Department of Agriculture in association with the U. S. Forest Service.



## BRIEFER ARTICLES AND NOTES



### POTLATCH FORESTS GIVES IDAHO FORESTRY SCHOOL TWO RESEARCH FELLOWSHIPS

Two fellowships, amounting to four hundred dollars each, have been given to the University of Idaho School of Forestry by Potlatch Forests, Inc., of Lewiston, Idaho. These fellowships will be used by the University for forest products research. They will permit studies on the possible development of processes for the economical conversion of saw-mill wastes to new products, particularly research on the plasticization of wood. The establishment of these fellowships will enable the School to place greater concentration of effort on the entire problem of the better utilization of wood and the development of new commodities.

These two fellowships, which were tendered in behalf of the Potlatch Forests, Inc. by Mr. C. L. Billings, vice-president, were accepted by the regents of the University at a recent meeting. The regents at the same time approved the appointment of the research fellows recommended by Dean R. E. McArdle of the School of Forestry. The appointees are Leslie L. Larson of Blackfoot, Idaho, who received the Bachelor of Science degree in chemistry at Idaho in June, 1934, and Joseph L. McCarthy of Spokane, a 1934 graduate of the University of Washington with a degree in Chemical Engineering. These men were chosen on the basis of their training and promise in research ability. The fellowships will enable both of these men to study for their Master's degree. The fellowship will be under the direction of Dr. E. C. Jahn, Associ-

ate Professor of Forestry, in charge of the Wood Conversion Laboratory.

The donation of these fellowships is another demonstration of the interest of Potlatch Forests in the development and growth of the Idaho School of Forestry. It is their second large gift to the University recently. Two years ago this company gave to the University 3,646 acres of ideally situated timber land on Moscow Mountain, only a few miles from the campus, which has formed the nucleus of the Moscow Mountain Experimental Forest.



### THE PENETRATION OF FUNGI THROUGH WOOD

The study of fungi in wood is made difficult by the resistance of the fungal hyphae to staining. The unstained filaments appear under the microscope as hyaline threads. In this state it is difficult to study the growth habits of a given fungus. The following method is suggested as a means of staining.

Thin sections are immersed in Böhmer's haematoxylon; the progress of the stain absorption is noted by washing a section in water and examining it with a microscope. Usually, about twenty-four hours in the stain is required. When satisfactorily stained, the sections are thoroughly washed in distilled water at room temperature and immersed in a 1 to 2 per cent solution of Bismarck Brown, watching the absorption as before, by inspection with the microscope. Dehydration follows by successive immersion in 30, 60,

90 per cent and absolute alcohol. After immersion in xylol the sections are mounted in Canada balsam. Sections of Douglas fir attacked by *Trametes pini* treated in this manner showed excellent differential staining, the wood being colored brown and the hyphae a dark blue. Similar but less contrasting results were obtained by substitution of aniline blue or malachite green for the Bismarck brown.

Other staining agents used were: Altman's picric acid, aniline blue, aniline safranin, aniline sulfate, carbol fuchsin, Delafield's haematoxylin, fuchsin, indole, malachite green, methylene blue, nigrosin, phloroglucinol and hydrochloric acid, Pianese IIIb, picric acid, picro-aniline blue, safranin, safranin bluish, safranin O, cupric acetate, ferric chloride, iodine and phosphoric acid, thallium sulfate, and zinc chloriodide. Mordants used were: iron alum, hexamethylamine, and tannin. Many combinations of these coloring agents, both with and without mordants were used. None gave decisive results.

The effect of acidity and alkalinity on absorption was investigated to determine the possible existence of an impervious film which would protect the hyphae from the stain. No consistent difference caused by variations in hydrogen and hydroxyl ion concentrations could be detected.

A study of the stained sections revealed interesting facts. According to Hubert<sup>1</sup> the hyphae of this fungus have large swellings adjacent to that portion which has pierced the wood, while the hyphae inside the cell wall are constricted. On the contrary, however, photomicrographs of sections prepared by the writer using the above procedure show the absence of these swellings, that the hyphae are the same size in the cell wall and in the cell lumen, and that the hole pierced

by the individual hypha is considerably larger than the hypha itself.

These findings would lead one to believe that the hyphae penetrate by the dissolution of the cell wall through the action of fungal enzymes. The large size of the hole probably indicates that the enzyme is not limited to the tip of the hypha but is distributed along a certain portion of the longitudinal face. It must be recognized, however, that this work is not completely conclusive, as it is conceivable that the swellings and the hyphae and wood in general may have undergone contraction during the preparation of the sections, although continuous observations did not indicate this possibility in the specific instance mentioned.

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#### THE NEED OF TAXONOMY IN FORESTRY

One evident lack in the training of the average young forester is his inability to identify and classify herbaceous plants. This weakness is often emphasized strongly on field trips where the botanist (if one is present) is constantly quizzed as follows: What is this plant? To what group does it belong, and does it have a wide distribution? It is rightly expected generally speaking that the botanist will give a ready, correct answer. Furthermore, because of his botanical training, he is also expected to know the woody plants and be able to give reliable taxonomic information concerning them. To expect the forester to be equally well trained in the wide range of plant life would be inconsistent; however, his botanical training should be

<sup>1</sup>An Outline of Forest Pathology, John Wiley & Sons, New York, 1931.



broad enough to include a taxonomic knowledge of the common plants of the forest flora—otherwise, he may be seriously handicapped in his profession. To be more specific, the forester should be well grounded in taxonomic botany for the following reasons:

*First.*—Herbs are indicator plants of forest types or of site conditions. The universality of change in all forests from birth to maturity is recorded in succession and each stage introduces an herbaceous population equally important as the trees and shrubs in the development of any particular unit. Without the correct names of the plants involved, the forester loses much of the real value of dynamic forestry.

*Second.*—In the management of the forest, the forester should know the herbaceous plants best adapted to any particular environment as well as those which indicate elements associated with biotic disturbances. The production of timber can proceed no faster than the biological balance of the site is maintained between the herbaceous and woody forms. In order to understand all the factors involved in production, the forester must go much further in his botanical training, knowing not only his trees but also the forest flora which includes both the shrubs and the herbaceous ground cover.

*Third.*—Grazing management as related to forestry calls for men with a sound training in the principles of taxonomic botany.

*Fourth.*—The recreational field promises in its present rapid development an opening to the young forest graduate not only in privately owned recreational centers but in national and state parks. Much of this employment rightly belongs to the forester and will no doubt be given him provided he is qualified. Before he can qualify, however, he must have a field knowledge of taxonomic bot-

any. It has been the experience of the writer in park recreational work that the family as a whole finds its greatest delight not in the largest of the vegetation units (the trees) but in the herbaceous ground cover composed of many plants whose beautiful blossoms and interesting habits of growth have a gripping morphological history if adequately presented. In addition, in some forest regions regulations have been established regarding the use of the herbaceous flora and the enforcement is usually delegated to the forest officer; therefore, he is obliged to know taxonomic botany.

*Fifth.*—The forester who elects to specialize or do graduate work will find research the desirable tool for detailed investigation. In the field he will be required to work with small units, preferably quadrats and plots as a desirable means of obtaining quantitative data. Again, he must know the names of the organisms which comprise the units involved, otherwise, he is not thorough and much of the real value of research is lost.

*Sixth.*—The forester who has taken advantage of taxonomical training and knows the names and interesting points about the herbaceous plants that he comes in contact with in the forest will receive more enjoyment from his work than the forester to whom these plants are strangers. As a rule, the more enjoyment that one receives from his work the more he puts into his work.

*Seventh.*—The graduate forester never knows where his profession will lead him and if he lacks taxonomical training his chances for success are reduced because the old theory still holds—the better the botanist, the greater are the opportunities for success in forestry or its related fields.

In order that the future forester may obtain the taxonomic training necessary to meet the demands, he must re-

ceive this training in the college classroom and field laboratory under competent supervision if it is to be adequate. Like mathematics and chemistry, modern taxonomy can seldom be obtained after leaving college because the stimulating force of instruction cannot be supplied at the right time and one is not able to continue effectively.

The apparent lack of taxonomic training in forestry is largely due to a misunderstanding between the botanist and the forester as to the subject matter to be included in taxonomy. In order to correct this condition, it is necessary for both to arrive at a common meeting ground and adjust their differences. Let us briefly review the contentions on both sides and see how adjustments can be made. First, the botanist must concede that the methods of teaching taxonomy have, in the past, been rather static. The old methods have failed to meet the needs of the present trend in botany, especially in forestry. Too much emphasis was placed on detailed drawings of the various parts of the flower which represented, in many cases, nothing more than repetition. This is a general sin which has been handed down by taxonomists and morphologists from generation to generation and has become so firmly entrenched as a part of the course that few botanists have been daring enough to eliminate such an exaggerated need. Furthermore, too much emphasis has been placed on the artistic value of the drawing and not enough upon the scientific aspects. Detailed drawings which have been commonly required by taxonomy teachers as a means of indelibly impressing the characteristics of the specimens upon the student's mind have proven impractical. Much of this training should have been carried on in the fields and woods where both classification and the study of the environmental factors of the plant could be correlated as part of the

mental picture. Complicated keys associated with difficult descriptive terms were a horror to students who had not dedicated their careers to the study of taxonomy and much of the real value of the course was lost. Such methods have also been responsible for the apparent dislike by many students for any phase of botany that requires only a few detail drawings as a part of the general laboratory program. The need of field work in elementary taxonomy cannot be too strongly emphasized in educational institutions as a whole because they are often situated in large urban centers where the expense and time involved to reach desirable regions for plant studies are quite prohibitive to the average student, consequently drawings take the place of habitat studies in the classification outline. The old method whereby a student was required to hand in at the close of the course a herbarium of a specific number of correctly classified species is still highly desirable. This method has often been instrumental in stimulating the collecting desire of students to such an extent that it has been carried over into their professional careers and many small valuable herbaria have accumulated throughout the United States. The collecting desire for herbarium purposes must certainly be encouraged in forestry since every forest district should have a herbarium representative of its flora. A small taxonomical library would also be desirable.

Secondly, the forester has been loathe to recognize the value of detailed knowledge in classification. He has too often failed to realize that the classification of closely related herbaceous species is determined by slight morphological differences between complex flowers. To obtain this end, much time must be devoted to careful technique and close observations. The forester must concede that herb classification requires more indoor labo-

ratory preparation of a detailed nature than tree classification based upon characteristics which can be differentiated without the aid of a hand lens. Another suggestion which is well founded is the need of more field work whereby the student can associate morphological classification with site factors. The demand that only certain types of the higher herbaceous plants should be considered is not in keeping with good forestry, nevertheless, the limited time allotted to a 2- or 3-credit course restricts the subject matter to the flowering plants. The forester's complaint that the terminology of most key manuals is needlessly complicated to be comprehensible to the average student is fundamentally right and there is a general move among botanists to correct such a condition.

This gulf separating the botanist and forester can be easily bridged and taxonomy made to rightly take its place in the general forestry curriculum as a live and dynamic subject. Its need in forestry is perfectly obvious; as a matter of fact, forestry is largely applied botany and men well trained in classification laid its foundation. The subject matter of taxonomy, like other phases of forestry, has changed during the last decade and new demands have called for changes and new adjustments. The biggest single step in formulating a better course has been the recent contributions of textbooks and manuals rich in organized fundamentals. These books have eliminated unnecessary difficult terms and replaced them by more simple ones without jeopardizing their meaning. These textbooks and manuals emphasize strongly the importance of phylogeny as a desirable means for the classification of the plant kingdom. The study of phylogeny should be valuable to foresters because it not only offers a simpler tool for the classification of the vegetation with which they work but also stresses their evolutionary

development. This subject can be adequately studied not only in the classroom by means of charts, illustrations and models but also under field conditions. The changes mentioned above and new departures in laboratory procedure, limiting indoor exercises to a sufficient duration to establish a working knowledge of flower details and efficiency in keying of species followed with well organized field work, should meet the requirements of a course in elementary taxonomy desirable for forestry students.

In conclusion, one of the greatest values received by students in the study of taxonomy is the emphasis placed upon the systematic classification of facts based upon the logic of differentiation and reorganization. Such systematic influences of organization are often applied to the activities of the student both during his college and professional life. Can the profession of forestry with its complexity and variety of interests profitably afford in the future to send their graduates into the various phases of forestry without the advantages of a training in taxonomy?

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#### A BRIEF RECORD OF SEED PRODUCTIVITY FOR CHESTNUT OAK IN SOUTHERN NEW JERSEY

Chestnut oak (*Q. montana* Willd.) is one of the principal species in the forests of the northwestern edge of the Pine Barrens of New Jersey. Because of repeated fires and cuttings, it now occurs, as do other species of this region, almost entirely as coppice. Economically and aesthetically this is not the most desirable type of forest but none other develops because of the many factors which



act to prevent the establishment of seedlings under these coppice stands.

In order to determine if this scarcity of seedlings might be partly due to a lack of seed, a survey of the seed producing capacity of fifty-five chestnut oak trees was made during three successive years. Under the crown of each tree two strips, one foot wide and ten feet long, were located arbitrarily. On this twenty square foot area the acorns and mature acorn cups were counted after all seed had fallen. The cup count was of course more reliable because most of the acorns were destroyed by animals before the examination was made. The following data for each tree were also collected: d.b.h., diameter, total age, number of rings in last one-half inch of radius, and the radial growth in inches for the five years preceding the last examination. This latter was collected as a measure of the vigor of the tree.

In Table 1 the trees have been thrown into groups based upon total productivity for each tree for the three-year period. The range in age, mean age, etc., for all the trees in each group has been determined. The two trees producing the greatest number of acorns have a current growth rate slightly greater than any other trees in the group. The non-producing group have the smallest average diameter and age. Otherwise there does not seem to be much relationship be-

tween seed productivity and age, size, or vigor. It is realized that this sample may be inadequate but it was first necessary to select trees that were partially isolated and this selection exhausted the possibilities of the particular stands examined.

It is to be expected that there would be an increasing productivity with increase in age. However, in the course of another study, several sprout chestnut oaks only eight years old were found to be producing viable seed. It is possible that seed productivity is inherent and that it is modified only slightly by age, site factors, etc. There is some basis for this statement in the data collected. Twenty-two of the 55 trees, produced no seed during the three year period. Ten of these trees were over 40 years of age and many of them were growing near trees which produced some seed. Superficially these non-producers differed in no way from adjacent productive trees.

This individual variation is further shown by data collected from two similar trees and presented in Table 2. Both trees are the same age and are located about four chains apart. Tree number 4 is slightly larger in diameter than tree 22 and possibly less vigorous. Otherwise there does not seem to be any apparent reason why there should be this difference in productivity.

With the exception of 1929, seed counts

TABLE 1  
TOTAL PRODUCTIVITY FOR THREE-YEAR PERIOD

Seed production, per tree, 1928, 1929, 1930	Number	Age		D.b.h		Rings last ½" radius		Radial growth 1925-1929	
		Range	Mean	Range	Mean	Range	Mean	Range	Mean
		Years		Inches		Number		Inches	
Acorns	Trees								
50-60	2	35-46	41	7.2- 8.7	7.9	7-10	8	.30-.35	.32
15-20	3	40-45	41	6.5- 9.7	8.4	6-18	10	.10-.40	.27
5-10	8	33-67	56	3.8-10.5	7.9	6-16	10	.10-.45	.27
1- 5	20	28-90	37	3.8-11.0	6.8	6-16	8	.10-.45	.29
None	22	21-42	33	3.2- 9.1	5.7	6-27	9	.10-.40	.28

have been made under these two trees from 1928 until 1933. The count was made on twenty square feet in 1928 and since then the entire crop of each has been counted.

TABLE 2  
SEED COUNT

Tree Number	Number of acorns				
	1928	1930	1931	1932	1933
	20 square feet	entire crop			
4	8	53	0	0	0
22	67	926	34	509	107

A seasonal fluctuation in productivity is evident in Table 2 and there may be a definite periodicity in seed crops for chestnut oak in this region. The record is not of sufficient length however to warrant such a conclusion. Based upon the total area of crown projection of tree 22, it is estimated that the 1928 crop for this tree was in excess of 2,000 acorns. The total production of all other trees studied was 117 acorns in 1928, 39 in 1929, and 72 in 1930. Apparently 1928 was a good seed year whereas in 1931 the crop was almost a failure. This is true only for those trees which produce some seed. For some trees apparently the seed crop is a failure every year.

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#### ENTOMOLOGICAL FACTORS AFFECT SALVAGING OF FIRE INJURED TREES

Results of study of selected fire-injured ponderosa pine trees, recently completed by the Bureau of Entomology in the Modoc National Forest, California, may prove of considerable aid in future marking of fire-injured trees for salvage. The record was taken on the site of the Sugar Hill fire of July, 1929, during the four years 1929-1932 and covers the time of

readjustment and recovery following the fire injury. Although the stand remaining after any fire will present conditions peculiar to the particular situation and will require special treatment, some conclusions resulting from the study may be of general application.

Mortality of fire-injured trees from insect attack was found to be greatest during the first and second years following the season in which the fire occurred. A resumption of more nearly normal conditions was observed in the stand during the third year after the fire.

The types of fire-injured trees that should be marked for salvage on any given fire area will depend to a large extent on the material that is left on the area. Trees that have suffered 100 per cent defoliation and also have had most of the buds killed will succumb without further injury by insects and should be salvaged. Trees that have suffered no fire injury should not be cut unless the logging operation is directed toward harvesting the stand in addition to the salvage of injured material.

Fire-injured trees that might survive if not attacked by insects have, according to the results of the study, different degrees of susceptibility to insect attack. Mortality due to the western pine beetle (*Dendroctonus brevicomis* Lec.), the species chiefly responsible for the insect damage to trees in the area studied, varied with the amount of foliage injury and more particularly with the amount of cambium injury caused by the fire. When foliage injury alone occurred, trees having 0 to 25 per cent of the foliage injured lost only 3.7 per cent of the total number of trees in that class while those having the same amount of foliage injury but relatively heavy cambium injury suffered a 10 per cent loss. In the group of trees with 25 to 50 per cent foliage injury, those with slight cambium injury lost 3.6 per cent, while those with moder-

ate to heavy injury suffered a loss of 13.3 per cent of the total. In the group with 50 to 75 per cent foliage injury the loss was 18.2 per cent for those without cambium injury and 37.5 per cent for those with that type of injury. The most severely injured group studied,—that having 75 to 100 per cent of the foliage and a small proportion of the buds killed—lost 19.2 per cent of the total number of trees in the class, while those with cambium injury in addition to the foliage injury lost 72.2 per cent.

The possibility of recovery without insect attack is indicated by the following list, which progresses from the least susceptible to the most susceptible type:

Per cent defoliation	Cambium injury
0 to 25	none to slight
25 to 50	none to slight
0 to 25	moderate to heavy
25 to 50	moderate to heavy
50 to 75	none to slight
75 to 100	none to slight
50 to 75	moderate to heavy
75 to 100	moderate to heavy

Although the severity of the injury and the number of trees left on the area determine to a great extent the types of fire-injured trees that should be salvaged, the results of this study indicate that, in general, it would pay to salvage the following classes, as the chances are greater that they will succumb to insect attack:

1. Trees having more than 50 per cent defoliation and moderate to heavy cambium injury, and

2. Trees having 75 to 100 per cent foliage injury and no or slight cambium injury.

The salvage of trees having 50 to 75 per cent foliage injury but no or slight cambium injury, and those with 25 to 50 per cent foliage injury with moderate to heavy cambium injury would depend on the number of trees to be left for

reseeding the area. Unless an unusually heavy stand of fire-injured trees in the less seriously injured groups is left by the fire, it would not pay to harvest individuals in these groups.

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#### SAMPLING THE FOREST NURSERY

In making an inventory of the Catahoula nursery stock, a method was worked out for taking a representative sample of the nursery beds.

A foot-square templet made of wire was placed at mechanically located spots, according to a diagram.

Complete counts, with the aid of a tally-register, were made on every plot, one on each 400 square feet of bed.

The data were tabulated and arranged in frequency distributions, from which were computed arithmetic means, standard deviations, standard errors, desired standard error, and the number of samples needed for the limit of accuracy of 3 times the standard error, or in this case  $\pm 15$  per cent of the true mean.

As a result of this study, we can recommend the following method for sampling a forest nursery to find the average number of trees per square foot, and the total number of seedlings on hand.

#### PROBLEM

The Catahoula Nursery, on the Kisatchie National Forest in north Louisiana, with a planned production of 12 million pine presented an inventory problem of considerable proportions. To find the number of trees on hand when the growing season is well under way, and again just before lifting, was the task confronting the nurseryman.

In the nursery are about 10 acres in



seed beds, or a total of 1,068 beds 4 x 100 feet. Of this number, 608 beds are to produce 5 million longleaf; 298 beds are to produce 5 million slash; and 162 beds are to produce 2 million shortleaf. These beds are arranged in five compartments, and each compartment is divided into eight sections.

The longleaf was grown from four different seed lots, the slash from two, and the shortleaf from one. Except in the case of shortleaf, several methods of extraction were used on each seed lot. This resulted in ten different seed groups for longleaf and four for slash pine.

## METHODS

To arrive at the average number of trees per square foot<sup>1</sup> of each seed lot of each species, the following methods were employed:

A templet of No. 8 telephone wire, bent into a square 12 inches on a side and divided into four quadrants by fine hair wire to facilitate counting, served as the unit of measure.

A mechanical selection of plots served to eliminate personal bias and to insure a purely random sample of the individual beds and of the entire nursery. On one square-foot plot for every 400 square-foot of bed, a complete count, doubly checked, was made with the aid of a tally-register.

TABLE 1

## SUMMARY OF COMPUTED RESULTS

Number of plots required to assure an accuracy of 5 per cent of the true mean in 99.72 per cent of samples

*In terms of trees per square foot*

Seed lot	No. of plots	(1) Arithmetic mean	(2) Standard deviation	(3) standard error	(4) Desired Standard error	(5) Required No. of plots	Ratio of (3) to (4)
Longleaf pine							
2A	42	40.02	±9.35	±1.461	±2.00	22.8	0.73
2B	30	47.17	±7.70	±1.431	±2.36	11.6	0.60
3A	73	41.73	±9.00	±1.061	±2.08	19.7	0.51
3B	83	37.10	±10.40	±1.149	±1.85	32.6	0.62
3C	69	39.70	±10.70	±1.296	±1.98	30.1	0.65
4A	32	40.80	±9.20	±1.651	±2.04	21.3	0.80
4C	73	23.41	±6.10	±0.720	±1.17	28.2	0.61
5A	126	23.51	±7.65	±0.684	±1.18	43.1	0.57
5B	18	28.00	±6.25	±1.516	±1.40	20.9	1.08 <sup>1</sup>
5C	46	20.30	±6.95	±1.035	±1.02	47.4	1.01 <sup>1</sup>
Slash pine							
1A	31	51.6	±11.60	±2.120	±2.58	21.2	0.82
1B	62	57.3	±24.10	±3.085	±2.86	71.7	1.07 <sup>1</sup>
6A	71	49.1	±13.00	±1.553	±2.45	29.1	0.63
6B	134	54.5	±12.65	±1.097	±2.72	22.6	0.40
Shortleaf pine							
1	162	54.7	±10.40	±0.820	±2.735	40.6	0.29

<sup>1</sup>Instances where actual standard error exceeded the desired standard error.

<sup>1</sup>It is not part of this study to present the arithmetic involved in arriving at the total number of trees of each species and seed lot in the nursery from this average figure.

These plots were taken by placing the templet 5 feet from the end of the first bed and 1 foot in from the north edge; the next bed was sampled 10 feet from the end, and 2 feet (the middle) from the north edge; the third, 15 feet from the end and 1 foot from the south edge; and the fourth, 20 feet from the end and 1 foot from the north edge.

#### COMPUTATIONS

The counts thus obtained were tabulated by seed lots. These data were then arranged in frequency distributions and the arithmetic mean, standard deviation, standard error, and the required number of samples to attain the desired standard error computed. This desired standard error was set at 5 per cent of the arithmetic mean in order to obtain an accuracy of 15 per cent of the true number of seedlings per square foot in 99.72 per cent of the samples taken.

#### DISCUSSION

An examination of the table shows that more than enough samples were taken for every seed lot except 5B, 5C, and 1B. The former may be accounted for by the fact that there were only 18 beds, too small a number to give a complete distribution; perhaps two samples per bed would do better here. In the case of 1B the discrepancy arises from the fact that two different densities of sowing were represented, and should have been separated. The difference between the actual and desired standard errors is so small in the case of 5C as to be unimportant.

We therefore can see that our sampling was reliable, and that in the next such inventory fewer plots may be taken—perhaps one plot per 600 square-foot instead of per 400 square-foot.

At first glance, the choice of  $\pm 15$  per cent seems rather high as a limit of accuracy. However, when we consider that with the contemplated close grading of

stock at the time of lifting the cull per cent will doubtlessly be as high as 20-25, 15 per cent is satisfactory as a limit of accuracy.

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*Southern Forest Exp. Sta.*

J. T. MAY,  
*Kisatchie Natl. Forest.*



#### UTILIZATION OF NORTHERN HARDWOODS IN NEW YORK

As early as 1930 chemists of the West Virginia Pulp and Paper Company began testing the suitability of beech, birch and maple for sulphite pulp at their Mechanicsville, New York, plant. Next in line was a survey of the potential supply of these species within a trucking radius of Mechanicsville. This was conducted by the writer in the summer of 1931. Four hundred thousand acres of beech, birch and maple type were mapped within a fifty mile trucking radius. Other types could also furnish additional acceptable wood such as grey birch and soft maple. On the basis of a growth rate of one half cord per acre per year a sufficient quantity of these species was available to satisfy in perpetuity the present yearly requirement of 30,000 cords. (This is in addition to the company's requirements for popple.)

This spring the company launched definitely on the policy of acquiring unbarked, unseasoned hardwood pulp from farmers within their territory. Nine dollars was offered for a 160 cubic foot cord of hard and soft maple, black, white, yellow and grey birch, and beech, delivered at the plant.

To woodland owners in the Upper Hudson Valley this new policy of the West Virginia Pulp and Paper Company is of outstanding significance.

## THE PROBLEM OF BARK REMOVAL

The difficulty of getting rid of the bark of such species as hard maple and beech presented obstacles to the success of the plan. The experience of northern pulp wood cutters in peeling was limited to spruce and popple, which was quite a different matter.

At this juncture the officials of the Company decided to avail themselves of a new type of barking machine recently patented and put on the market by the Council Tool Company of Wyanish, N. C. This machine works on the principle of pounding the bark until it loosens and falls off. A five foot cylinder (because the pulpwood is cut in 5-foot lengths) about 2 feet in diameter bears 12 rows of loosely hung free-swinging hammers—17 hammers to the row. This makes a total of 204 hammers. As the drum revolves forward the free ends of the hammers are flung outward from their recumbent position against the cylinder by centrifugal force and thus *strike* and *pass* on, any object brought within range. A hand operated level brings the log to be barked into contact with these whirling hammers, and a geared chain turns the log slowly in the opposite direction from the cylinder. The cylinder revolves at the rate of 150 r.p.m., so the 5-foot stick in the course of a minute is subjected to 30,000 hammer blows. Can you imagine any bark withstanding this pounding? If desired the turning of the log can be arrested by depressing a foot lever. Any particularly recalcitrant bit of bark is then hammered until it flies off as the rest has already done.

The machine requires from  $7\frac{1}{2}$  to 10 horse power to operate, and is designed to be used at pulp wood piles in the woods, taking the power from the same tractor as drags it into position; its weight is approximately 3 tons.

At a demonstration held at the Mechanicsville plant on May 17 fractional cords of unbarked wood of all the species listed for purchase were run through the barking machine for the benefit of 250 interested land owners in attendance. Of particular interest to the guests was the efficiency of the machine in removing bark from winter cut wood. As was to be expected it took longer to remove than in the case of spring cut wood, but the difference was not so great as to render spring barking of winter cut wood impracticable.

TABLE 1  
BARKING TIME

Sticks Size	Season Cut	Second per stick
6"—8" maple, beech and birch	Spring	20
6"—8" maple, beech and birch	Winter	30

These are average figures (Table 1) and are based on straight sticks with knots trimmed very close. On the basis of these figures a 90-stick cord of winter cut wood can be run through the barking machine in less than an hour. Larger sticks increase the barking speed to an appreciable extent. Three men are used to operate the machine. On a 40 cents an hour rate for the men, the actual labor cost of barking winter cut wood would not be greater than \$1.00 a cord.

Hand peeling of wood is restricted to a very limited period in late spring and summer. The use of this machine permits year-round cutting and extends considerably the period when peeling is practical. The writer actually saw bark being removed from frozen beech in temperatures around zero. The time was 1.30 seconds as compared with 30 seconds for similar winter cut logs barked in May.

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Extension Forester, N. Y. State.



# THE EFFECT OF WEEDING ON THE SURVIVAL AND GROWTH OF WHITE AND RED PINE<sup>1</sup>

A weeding, as defined by the Society of American Foresters, is "a cutting made in a stand not yet past the sapling stage for the purpose of removing trees of undesirable form or species which are injuring or are likely to injure those of greater promise." European writers on forestry take weeding for granted as an essential part of the raising of timber crops. American writers, in general, describe this type of cutting as being in the experimental stage, although holding great promise for the future.

Weedings, properly timed and executed, are often necessary to prevent the smothering of the valuable elements of young stands by rapid-growing inferior species. In this country, they find their greatest usefulness in the east, and have been developed furthest in New England. Even in that section, the need for a cash outlay has been a serious obstacle to weeding, in spite of the fact that foresters have been convinced of the benefits of improved composition and increased growth that would accrue. The inauguration of the C.C.C. program, however, has made it at least temporarily possible to do much cultural work of this type.

The effect of weeding is illustrated in the accompanying table, giving the results of measurements made in 1931 in weeding plots on the Yale Demonstration and Research Forest at Keene, New Hampshire. The plots, which averaged one-tenth of an acre in size, were located in plantations of white and red pine (*Pinus strobus* and *Pinus resinosa*) set out in 1916 and 1917. Most of the plots were laid out in the center of quarter-

acre permanent sample plots. Spacing varied from 4 to 8 feet, but was in every case the same for paired plots. The hardwoods on the check plots, chiefly gray birch (*Betula populifolia*) and big-tooth aspen (*Populus grandidentata*), were of approximately the same age as the pines.

The method of weeding used called for the removal of all hardwood stems. The check plots are classified as having "continuous" or "partial" canopy according to the number of hardwood stems present at the time weeding was made on the corresponding paired plots. The plots with continuous canopy had from 1,300 to 1,800 hardwood stems per acre one inch in d.b.h. or over; those with partial canopy supported from 300 to 400 such stems at the time of weeding.

Survival was determined on those plots for which previous records were available. The data show that weeding exercised a negligible effect on the survival of pine of both species in the seven to nine years which had elapsed since weeding. This is probably due to the fact that the hardwoods present consisted mainly of the more intolerant open-foliaged species and offered comparatively light competition.

Total diameter growth was found to be from 75 to 200 per cent greater on the weeded than on the unweeded plots, where continuous hardwood cover was removed (excluding Plots 41 and 42, which represent an extreme case). As diameter is directly related to crown spread, these data give an idea of the relative vigor of the pine under weeded and unweeded conditions. Where the cover removed was partial, the increase in diameter growth was from 25 to 60 per cent.

Total height growth on weeded plots

<sup>1</sup>This paper presents the main conclusions of a doctorate study made in 1931 under the direction of the late Professor J. W. Toumey of the Yale School of Forestry.

from which continuous cover had been removed was from 35 to 50 per cent greater than that on the check plots. On the white pine plots, this increase was made in spite of heavy weeviling. This increase, while much less in percentage than the gain in diameter growth, is probably more significant because it enabled the pines to maintain dominance over the hardwood sprouts which quickly sprang up following weeding. The plots freed from partial cover showed only a negligible increase over the check plots in height growth.

The data on weeviling bring out clearly the fact that weedings in white pine lead to a heavy increase in weevil infestation. Of the white pines examined, 51 per cent of the trees on weeded plots had been weeviled in the last three years, 32 per cent of those on check plots with light canopy and only 3 per cent of the trees on check plots with heavy canopy. A minor type of defect, found on both white and red pine, is failure of the terminal bud. This defect was found to be consistently less on the weeded than on the check plots. Of the white pine plots, the check plots with partial canopy showed the most desirable condition, considering growth and weevil injury. Their growth was only slightly less than that

of the weeded plots and the extent of weeviling was substantially reduced.

The following conclusions may be drawn for the practice of weeding on the forest in question:

1. In making weedings in white pine, partial cutting, which removes only the material actually hindering the growth of the pine and leaves the remainder for protection from injury, will secure the best rate of growth commensurate with a reduced amount of weevil injury.

2. In making weedings in red pine, which is not susceptible to weevil attack, all hardwoods may be removed.

3. The weeding of white or red pine less than ten years old since planting is not economically justified unless there are upwards of 800-1,000 hardwood stems per acre one inch in d.b.h. or over and as old or older than the pine.

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#### ERRATUM

In the November, 1934, issue of the JOURNAL the following correction should be noted; on page 876, column 1, line 23 should read "legislation that will punish employees,".



## REVIEWS



**Growth in Selectively Cut Ponderosa Pine Forests.** By Walter H. Meyer.  
*U. S. Dept. of Agricultural Bul. No. 407, pp. 64, figs. 15, Apr., 1934.*

With the use of this highly exhaustive bulletin, the operator can assume any system of cutting for his forest and determine what the resultant rates of growth will be. The author has attempted to incorporate the virtues of several methods to use as the basis for his work. These methods include permanent sample plots, diameter accretion, growth percentage, and reserve-stand growth which, in turn, is based on temporary sample plots.

The following factors that affect the rate of growth of selectively cut pine stands are discussed in detail: site quality, reserve volume, tree class and stand structure, spacing and release, composition, growth cycles, length of cutting cycle and mortality. To the reviewer, one other factor should have been included and that is fire history. Particularly the indirect effect of fire as it influences the duff-humus layers. This layer, in turn, determines to a large extent, the moisture content and fertility of the soil. These are one of the major factors determining the growth rate of trees. Surely in the future our forests will be exposed to less fire and this should influence growth rate and density of our stands.

The reviewer differs with the footnote on page 4 of this bulletin. Age is not the major factor that determines if a ponderosa pine tree is a "bull pine" or a "yellow pine." Rather it is a condition of growth. The rapid growing, thick,

rough-barked, pointed crown tree is the typical "bull pine" even though it is four feet in diameter and 200 years old. Some trees possess the opposite characteristics and are destined to be "yellow pines" almost from the seedling stage.

Two typographical errors were noted, one in the fourth line on page 42 where, apparently, there was a transposition of figures, and one under Plate 4 where the title should read 15 instead of 5 years.

The mention of an individual is seldom made in the reports of The Forester, but the 1933 issue carried the following mention of Dr. Meyer's contribution:

"A new method of estimating growth in selectively cut stands promises to prove one of the most far-reaching accomplishments in many years. Developed for ponderosa pine by W. H. Meyer, of the Pacific Northwest Forest Experiment Station, it can probably be applied to other species growing under comparable conditions. It enables the forest manager to calculate how heavily he should cut to obtain the greatest possible subsequent growth, and approximately when he can cut again. A by-product of this study was the discovery that climatic cycles result in wide variations in growth rates, which may seriously disrupt forest-management plans unless proper allowance is made for them."

Foresters and operators can read carefully this excellent contribution to our forest literature. It leads the way in methods and techniques of determining the answer to the problem, "If I cut my forest in a given way what will be the result in a given number of years?" We



can look forward to publications from the other timber regions using approximately the same procedure.

T. J. STARKER,  
Oregon State College.



**Temperature as a Factor of Regeneration in the Spruce Forests of Northern Trondhjem.** By Elias Mork. *Meddelelser fra Det Norske Skogforsokvesen No. 16. Vol. V, No. 1, 1933. 153 pages, tables 31, figures 44, Summary in German.*

In this very interesting report, the author presents the results of a five-year study of temperature as a factor in the regeneration of spruce forests. The importance of the problem of natural regeneration of spruce forests in Norway is perhaps best appreciated when one considers the large percentage of coniferous forest land on which conditions are unsuitable for natural reproduction. In the Northern Trondhjem district alone, the Norwegian Forest Survey in 1924 found that over half (50.15 per cent) of the coniferous forest land had conditions unsatisfactory for natural regeneration.

Very thorough and detailed experiments were carried on under controlled conditions to determine the various factors influencing seed germination and the results have yielded much valuable information.

It has been generally conceded that the prevalence of low temperatures is the limiting factor in spruce regeneration. Yet, little definite information has been known of the relation between temperature and spruce seed germination.

In the process of demonstrating the widespread importance of prevailing low temperatures, the following detailed conclusions were reached:

(1) The greatest temperature difference between forest and barren cutover ("Kahlschlag") land is in the germination layer, which on some days is 9° C warmer on the barren areas.

(2) The temperature of the soil in the forest varies with density. In two stands with equal cubic volume, but with a different number of trees per decare, the temperature of the surface soil is greater on that land having the fewer number of trees.

(3) The mean diurnal temperature of the germination layer on a barren cut-over area can be increased by soil preparation. If there is a thick humus cover, soil preparation will tend to increase soil heat in the lower lying layers, since the heat conductivity of the soil is greater when the humus cover is mixed with mineral soil. In the forest, on the other hand, the variation in the temperature of the germination layer remains relatively slight even after soil preparation.

(4) The mean diurnal temperature of the germination layer on rotted stumps and windfalls on barren cut-over areas as well as in forests, is always higher than the temperature of the germination layer in the soil surface.

(5) The highest temperature observed in the germination layers was 35.4° C.

(6) During the growing season from June through August, the mean monthly temperature of the germination layer is always higher than in the other soil layers.

(7) The variation between air temperature on a barren cut-over area and in a forest is greater the higher the summer temperatures.

(8) The relation between air temperature and the temperature of the germination layer on a barren cut-over area varies with exposure. On level areas, the summer temperature of the germination layer is higher than the air temperature. On north slopes, on the

other hand, the air temperature, during a very warm summer, will be higher than the temperature in the germination layer.

(9) The mean daily temperature of the germination layer determined from readings at 8, 14 and 19 o'clock agrees very closely with the actual mean temperature between 6 A. M. and 6 P. M.

Other results reported by the author dealt with the investigation of some of the factors having an influence upon the germination of spruce seeds and with investigations of seed production and seed quality and the factors influencing these.

In discussing the formation of empty seed, the author included some excellent microphotographs which show the position and extent of seed material of spruce in unpollinated and pollinated female flowers at different stages of development.

The final chapter is devoted to a summary and discussion of the conditions for forest regeneration in Norway and Sweden. Here the author reports the opinions and findings of the Scandinavian investigators on the forest regeneration problem.

C. F. OLSEN.

*Southern Forest Experiment Station.*



**Aerial Photographs and Their Interpretation.** By Nils Hagberg. *Svenska Skogsvårdsföreningens Tidskrift*. Vol. 31, No. III, 1933. 39 pages, 22 photographs. Summary in German.

Notable and rapid advancement has been made within recent years in aviation. The science of aerial photography, however, has not kept pace with the rapid development made in aviation.

The author of the article cited reports the results and experience gained from a very detailed scrutiny and study of vertical aerial photographs taken in Sweden

within recent years. He first discusses the fundamental conceptions of photography and then elucidates upon aerial photographs and the methods used in reading and understanding them. These aerial photographs, in the course of the study, were examined closely both in the laboratory and field.

The instruments commonly used for reading aerial photographs are a magnifying glass of 5-6 power and the stereoscope. The magnifying glass is recommended if the light contrasts on the photographs are poor. It is desirable that such a glass have more than one lens in order to reduce the photographic error of distortion toward the periphery of the field of vision.

The author believes that the greatest value of sunlight for aerial photography is found, not in the sharpness it imparts to the photographs, but rather in the shadows that are formed. The length and degree or depth of shadows are used in determining the size and height of objects as well as for identifying them.

Since color contrasts are used in distinguishing various objects on an aerial photograph, the author has developed a color scale in which absolute white is given a value of 100 and absolute black a value of 0. The different shades existing between these two absolute colors are given their respective value in the scale. Objects appearing on an aerial photograph present certain definite relative color values.

Examples of these are:

Roads	about	80
Unreproduced areas		50-75
Meadows	about	50
Marshes		30-40
Water		20-40
Shadows		20-30

The author discusses methods, based

mainly on color and shadow variations and contrasts and on differences of light absorption and reflection, that have been developed and adapted to distinguish between buildings; roads, ditches and stone fences; cultivated land and meadows; marshes, clear-cut forest land and heaths; water; and mountains and slopes. The appearance of various forests species, in mature, immature and reproduction stands, and of cleared boundary and survey lines, and the methods of identifying less visible terrain features of especial interest and importance in forestry are described and illustrated with accompanying photographs, both aerial and ground.

The splendid photographs in this article add much to its value. In several instances, the author has marked certain features on an aerial photograph and then included a ground photograph taken at the point marked. In this way, one can easily and quickly compare the same view as seen both from the air and on the ground. This helps immeasurably in estimating the real value and usefulness of aerial photographs.

C. F. OLSEN,

*Southern Forest Experiment Station.*



**The Charcoal Iron Industry of the Hanging Rock Iron District—Its Influence on the Early Development of the Ohio Valley.**  
By Wilbur Stout, State Geologist,  
*Ohio Archaeological and Historical Quarterly Vol. XLII (1): 72-104.*  
*Map. Illus. Jan., 1933.*

Mr. Stout is to be complimented in bringing together this information. His paper fills a place in the history of the removal of Ohio Valley forests which is known to few foresters, and it is of further value in presenting an excellent pic-

ture of the social life of the nineteenth century in Ohio. The paper is an outgrowth of his intense interest in the old charcoal industry and the hub which it proved to be in the development of local independent self-supported communities. He has made a hobby of collecting old photos of the charcoal furnaces in the Hanging Rock Region, and probably no one has a more inclusive knowledge of them.

The birth and development of the early iron industry in the Hanging Rock Region of Ohio and Kentucky filled a great need for iron in the frontier of the Ohio Valley. The movement of iron from the East, across the mountains was slow, costly and difficult. By 1875, about 24 charcoal stacks in Kentucky and 45 in Ohio had been built over a span of 56 years, mostly 1832-56. A list is given showing the location, date, capacity and builder of each stack in the 1800 square miles of the District. The furnaces were rather uniformly spaced 3 to 5 miles apart.

Each furnace was a unit of settlement requiring from 100-200 men and 50-100 yoke of oxen. The work of the unit consisted of building and repairing the furnace, chopping and charring the wood, mining ore and limestone, hauling stock to the furnace, roasting it, smelting the ores, hauling iron to the nearest market or shipping point on the Ohio River, operating the Company store, and the management of the whole operation. Local farming and gardening supplied the staples of grain, vegetables, meat and wool to feed and clothe the community.

The framing of the stock sheds, head and engine houses, and other buildings, as well as the lumber used in their construction, all came from the local forest and was cut on the ground.

Charcoal was used (1) to roast the ore in open piles (whereby about 16 per cent



volatile matter was lost and the ore was converted to a porous higher oxide of iron) and (2) in the smelting process. In addition to limestone, about 137 pounds of charcoal were required to smelt a ton (2268 lbs.) of iron. The charcoal requirement of a hot blast stack was about 11,370 cords and that of a lower iron-producing but greater charcoal-consuming cold blast stack was about 11,680 cords a year.

Virgin timber produced about 40 cords per acre and average second growth about 20 cords. This meant the cutting over of 200-600 acres of timber annually or about 300-350 acres on the average, for each stack in full operation. Since stands were cut on a 20-30 year rotation, a tract of 6,000-10,000 acres was required for each furnace. Skilled choppers cut as high as 3 cords of wood a day during a 120 day season from October to mid-April, a crew of about 48 being needed for a furnace.

Colliers did the charring in pits averaging 35-45 cords of wood. This operation took 12-20 days. Oak, hickory and maple yielded a hard, highly prized charcoal which was preferably to that from poplar and softer woods.

The iron-master was the kingpin of the community. His house was the largest in the community and served to harbor travelers and guests since taverns and hotels were still few or unavailable. Scrip dollars redeemable only in the community and at the Company store, which was the center of trade, were issued by the manager of the furnace, in many cases, because of the scarcity of money.

Following a lecture on charcoal furnaces, Mr. Stout stated (in answer to question), that the timber converted to charcoal was not even a tenth of the original stand of southeastern Ohio. He said a bell used to hang on the cast shed and that a ringing of it on discovery of

fire in the woods brought the men a-running to put it out. It was to their interest to keep fires out of their woodland holdings.

He further stated that the quality of charcoal iron is much superior to the iron produced with coke today because of the high carbon and very low sulphur content of charcoal iron. Lock fittings of the old canal system in Ohio, kettles, andirons, and other products of the early furnaces today are sound and uncorroded for the most part, in contrast to the early and rapid rusting of iron produced by present day large-scale methods using coke and coal.

He mentioned that a movement is under way to create a state park in Ohio commemorating the old charcoal iron industry. It is planned to restore one of the better preserved old stacks with its superstructure, engine house, and other outlying buildings. Foresters will be interested because of the historical value which such a move has. It is comparable in pertinence to the preserved piece of the "Campus Martius" at Marietta, Ohio (constructed of yellow poplar logs); the old Ohio Land Company office (yellow poplar logs and cherry ceiling); and the restored early Moravian settlement of Schoenbrunn, near New Philadelphia, Ohio.

L. F. KELLOGG,  
*Central States Forest Exp. Sta.*



**Het Landgoed "De Utrecht."** By  
Utrecht Life Assurance Co., Utrecht,  
Holland. *Not dated, pp. 51. English,  
French and German summary.*

This beautifully illustrated pamphlet describes a 5,446-acre private forest and farm property, developed out of waste heath lands since 1898. The company

owning this property must be credited with carrying out a very interesting and successful piece of heath land reclamation. Visitors interested in such work are welcome to visit this property.

Acquisition of this property began in 1898 and improvement of it in 1899. By 1933, 2,838 acres had been afforested; 1,067 acres had been converted into improved agricultural land; 1,155 acres, mostly to be afforested, still required improvement; and the remainder, 386 acres, was in administrative or recreational sites, in old forest or in fens that are to be left undisturbed.

At first, Scotch pine was used almost entirely in the afforestation work. More recently, however, Japanese larch, Douglas fir and oak, together with small amounts of several other species, have been used extensively. Mixed plantations, using 2,000 to 3,000 trees of the primary species and 1,000 to 2,000 trees of the secondary species, are now favored over pure ones. No preliminary cultivation was given the areas planted to Scotch pine, but the areas planted to other species were ploughed, seeded to blue lupines for a year and then fertilized with 265 to 350 pounds per acre of basic slag, often also with marl, potash and phosphate.

The forest products, harvested by Company employees, largely from thinnings, are being marketed in various parts of Holland mostly in the form of mine props and fuel wood. The operation of this property gives employment to between 40 and 50 laborers throughout the year, and to between 70 and 80 laborers during the winter, while thinning is being carried on, and during the planting season.

Of the 1,067 acres that have been converted into improved farm land, 815 acres are divided among 14 farms, 13.6 acres are in an apple orchard, and the remainder is in improved pasture which is rented to the occupants of the farms.

In addition to the buildings going with the 14 farms, there is a house for the manager with several acres of park around it, two residences for foresters, 21 houses for laborers and an Inn for the recreational use of the office employees of the Company.

J. H. ALLISON,  
*University of Minnesota.*



**North American Trees—Guide to Charles F. Millspaugh Hall.** By Samuel J. Record. *Field Museum of Natural History, Chicago, 1934. Pp. 119; 5 $\frac{3}{8}$  x 9 $\frac{3}{4}$ ; 84 figs. Price 50 cents.*

This book was written to serve as a guide to the collection of North American trees exhibited by the Department of Botany of Field Museum. Eighty-four species are included in the series, selected primarily on the basis of the commercial value of their lumber, but a few species of secondary or even scant importance are also displayed, to furnish a conception of the wide variety of trees that constitute the forests of North America.

The text is identical with that of the explanatory labels accompanying the specimens exhibited. In each instance the author has endeavored to give a concise description, aimed at uniformity, and devoid of purely technical terms, of (a) the tree, its size, taxonomic characters, supplemented by figures reduced to scale, and distribution; (b) essential facts pertaining to the macroscopic structure of the wood; and (c) utilization of the wood.

Apart from its special relation to the Museum's exhibits, however, this publication can be recommended as a work of reference for class use, to those actively engaged in forestry and the lumber trade,

and to the many who wish to extend their knowledge of the forest resources of this country.

L. WILLIAMS,  
*Field Museum of Natural History.*



**Ett 25 Arigt Forsok Med Naturfor-  
yngring I Norrlandsk Rhumus  
Granskog. (Natural Reproduc-  
tion of Spruce in Sweden).** By  
Sven Petrini, *Meddelanden Fran Sta-  
tens Skogsforsoksanstalt, Häfte 27,  
N:r 7, 1934.*

In 1906 and 1907, the Swedish Forest Experiment Station established four series of cutting plots in a 200-year old Norway spruce forest near Haverö, Medelpad. This article presents the findings brought out by a re-examination 25 years later.

Each series of plots represents a distinct size of opening made by clear cutting. The dimensions of the openings are 40 x 120, 40 x 40, 30 x 30 and 20 x 20 meters. In each series were three plots representing different soil treatments. One plot was left as it remained after cutting; on another the logging slash was piled and burned; and on a third the soil was hoed in spots 1½ feet square and spaced 4 x 4 feet. Within each plot, distinction was made between two soil forms—*iron podsol* and *humus podsol*, and within each of these classes were recognized three plant communities: *Vaccinium*, *Dryopteris*, and *Geranium*.

In 1932, and 1933, a detailed survey was made with the object of determining the density and distribution of tree seed-

lings with reference to each of the various factors involved. Seedling counts were made on meter square quadrats in strips 2 meters wide, extending across the plots at intervals of 5 meters, thus covering 40 per cent of the plot area.

Regeneration is now for the most part practically complete, averaging 8,000 plants per hectare, of which 6,800 are spruce and the balance mostly birch. The spruce seedlings average 13 years old and 3 to 4 decimeters high. About 12 per cent are classed as poorly developed. Fully 60 per cent originated in 1918 and less than 7 per cent before that year. From this relation the author draws the conclusion that from 11 to 12 years were required for the areas to become ready for regeneration. Seedlings are older and more abundant on humus podsol than on iron podsol, but height growth has been more rapid on the iron podson. Of the three vegetation types or plant communities *Vaccinium* has shown the poorest results; this is most noticeable on the iron podsol. Reproduction has been furthered in a decisive manner by brush burning and in less degree by hoeing.

Of special interest is the influence of size of openings. The 20 x 20 meter openings gave the poorest results and are considered too small for effective reproduction. Next in order of low value come the 40 x 120 meter openings, though these have been fairly successful. The 30 x 30 meter openings gave the best results on the basis of both total number of seedlings and in low percentage of blank quadrats.

G. A. PEARSON,  
*S. W. Forest and Range Exp. Sta.*





## SOCIETY AFFAIRS



### CHIEF FORESTER ASKS COÖPERATION TO REDUCE MAN-CAUSED FIRES

Forester Silcox has decreed that the time is propitious to make an intensive drive to cut down the number of man-caused fires throughout forested areas. All organizations in the United States—and their name is legion—will be called upon to participate in the program to the full extent of their resources.

The Forester has delegated Assistant Forester, Paul G. Redington to head up the campaign. The Society of American Foresters is in a fine position to help the cause. We are confident that the members of the Society will do their utmost to make this program a success. The following letter to the Executive Secretary is Mr. Redington's first shot from his gun.

DEAR MR. REED:

The record of the calendar years 1926 to 1933 on national and state forests and on areas protected under the Clarke-McNary Act indicated a total of 205,568 fires, due solely to man's carelessness. The fire roll call in the national forests this calendar year up to October 10 last, indicates a total of 5,282 man-caused fires, as against the average of the last three calendar years of 3,898. In other words, the present calendar year showed an increase of man-caused fires of 35.5 per cent.

Despite the excellent work done by foresters and allied agencies, the toll on forested areas was very heavy. This is an intolerable situation and drastic measures to cut down this unnecessary loss will have to be taken in the immediate future. Forester Silcox has very definite-

ly indicated that the time is now ripe to put on an intensive campaign to ameliorate the very bad situation that now obtains. Nothing can be done unless there is well nigh perfect team work throughout the country. The general program tentatively is as follows:

1. At the proper time the President may be asked to issue a proclamation dealing specifically with the forest fire hazard.

2. Governors of the states will be asked to participate in the fire reduction program through all means at their command.

The state foresters, at a meeting held in Knoxville, Tennessee, October 16 and 17, adopted a resolution favoring the proposal for an intensive drive for a country-wide fire campaign.

3. The following agencies, all interested in decreasing the fire toll, will be asked to participate actively:—American Legion; the various service clubs; automobile associations; national conservation agencies; women's clubs; Boy Scouts; lumber manufacturers and wood-working industries; chambers of commerce; county boards of supervisors; 4-H Clubs; tobacco companies; extension services; livestock associations; railroads; schools; churches; tourist organizations; dude ranchers; national granges; mining groups; Society of American Foresters; American Forestry Association; American Nature Association; National Education Association; Daughters of the American Revolution; Sons of the American Revolution; Veterans of Foreign Wars; National Fire Protective Association; National Firemen's Association; National

Association of Broadcasters; motion picture concerns; National Recreational Congress; et al. These bodies will be approached to secure their reaction to the proposed intensive drive.

4. The use of radio broadcasts will be given due consideration and an effort will be made to interest the motion picture industry in new fire pictures. Other details, in respect to the set-up, such as securing speakers, magazine articles, necessary pamphlets, fire prevention signs, etc., will be worked out as rapidly as possible.

I feel sure that the members of the Society of American Foresters will be interested in and take a large part in this program. Editorials and articles in respect to the undertaking will be appreciated. Particularly we need new and dramatic ideas to inculcate in the program.

The intensive drive will be put on in the early spring months of 1935, and from time to time you will receive further information regarding progress.



#### SOCIETY PROTESTS REMOVAL OF STATE FORESTER JACKSON

The following statement of the Society was released to all Kentucky newspapers on October 27th.

#### POLITICAL WRECKING OF STATE FORESTRY DEPARTMENT OF KENTUCKY CONDEMNED BY SOCIETY OF AMERICAN FORESTERS

The recent dismissal of W. E. Jackson, State Forester of Kentucky, and the consequent resignation of his entire technical supervisory force has set back the cause of forest conservation in the state by ten years, in the opinion of the Society of American Foresters. This society is national in scope and includes in its mem-

bership over 2,200 foresters in federal, state and private employ. The facts regarding this unfortunate situation, as determined by the Society's officers, are as follows:

On October 1, W. E. Jackson, whose term expired June 30, but who had been continued in office, was dismissed and replaced by K. S. McConnell. Mr. Jackson's dismissal was promptly followed by the voluntary resignation of both of his technical assistants, Bell and Nichols. The state forestry organization is completely shattered. Coöperators in fire protection under the Clarke-McNary Law have withdrawn their coöperation. The accumulated training and experience of this administrative organization is lost to the state.

If the state officials responsible for these acts, namely, the Governor and the Commissioner of Agriculture, were to select the best trained men available to replace this force, and could secure their services under the unfavorable conditions now existing, it would still mean a definite set-back to forest conservation in Kentucky until local experience was acquired by the newly appointed men.

There is no evidence that this is the intention of the state officials. The appointment of the new state forester was in fulfillment of a political promise made by the Governor previous to his election two years ago, and is in violation of a written agreement between the state officials and the U. S. Forest Service to the effect that the merit system should govern appointments to the state forest service.

The state forester, Jackson, was assured by the Governor and Commissioner of Agriculture that his dismissal was no reflection on his efficiency or ability and that the conduct of his office had been satisfactory.

The success of a state forestry program

in Kentucky depends upon building up an intelligent sentiment against the setting of forest fires, backed by impartial law enforcement. This is impossible unless the forestry department is removed entirely from partizan political appointments and kept in the hands of officials retained solely on the basis of merit and efficiency. To pay a political debt, the program of fire protection in Kentucky has been set back a decade, with no assurance that the progress made by the ex-state forester and his able and conscientious assistants will be resumed or repeated.

The forest wealth of the state, with its intimate relation to the welfare of the entire body of its citizens, must not be placed in jeopardy by adoption of a political system in place of merit and efficiency.



#### FORESTERS WARN OF DANGER THAT U. S. FOREST SERVICE MAY BE TRANSFERRED

On October 29th a statement by the Society was released to newspapers throughout the country and to the several organized press associations. It was subsequently sent to lumber trade journals, agricultural journals, trade associations, conservation organizations, forestry schools, state foresters, and other interested agencies.

President Chapman in releasing this statement to the press said: "We speak with full knowledge of the situation, extending over 30 years in saying that conservation interests throughout the entire United States are a unit in opposing such transfer. We further believe that should it occur, the confidence of the public in the President's conservation policies would be weakened and the ultimate effect on forest conservation would be extremely detrimental. We have been re-

strained so far from voicing these opinions only by the lack of tangible evidence that such transfer might take place but can no longer ignore the cloud of rumors and more positive assertions which are sweeping the western states and is rife in Washington, D. C." The press release follows:

The Society of American Foresters, which is the national professional organization of foresters of the United States, issued a statement today sounding an alarm that the U. S. Forest Service and the national forests are in danger of being transferred by Executive Order from the Department of Agriculture to the Department of the Interior. The Society affirms its unalterable opposition to such a transfer as being against the best interests of the Forest Service, forest conservation, and the efficient administration of the national forests. The statement also says that the proposed transfer raises the possibility of the abolition of the existing classified Civil Service status of the entire personnel of the Forest Service. The Forest Service has a personnel of 3,000 and administers 160,000,000 acres in the 140 national forests. The statement, signed by Professor H. H. Chapman, of the Yale Forestry School, as President of the Society of American Foresters, is as follows:

"There is great danger that President Roosevelt, in planning a new set-up of government bureaus, may be prompted to issue an Executive Order transferring the U. S. Forest Service from the Department of Agriculture to the Department of the Interior. The Society of American Foresters is unalterably opposed to such a transfer and believes that its position is that of practically all of the professional foresters of the United States.

"The U. S. Forest Service was born in the Department of Agriculture and has been built up in that environment.



In 1905 President Theodore Roosevelt turned over the custody of the national forests to the Department of Agriculture with the cordial assent of the Department of the Interior and with general public approval. Thereupon began the development of the Forest Service, which, in association with other phases of land utilization under the Department of Agriculture, has developed a public service bureau which is without a superior in any other country. From the beginning the Forest Service has been organized strictly in accordance with a fixed plan of appointments and promotions by merit and on the administrative principle of decentralized responsibility.

"It is our firm opinion that forestry, having to do with a product of the soil, belongs in the Department of Agriculture and we are convinced that the Service, even under the best of other conditions, could not fulfill its duties if it were in the Department of the Interior. For example, there is obviously a close relationship between the regulation of grazing on the non-forested lands of the national forests and on the unreserved public domain, and animal husbandry. The erosion and irrigation problems are closely related to the management of forests; and, of course, farm woodlands are indisputably within the field of the Department of Agriculture. It would be most unfortunate to separate the Forest Service from the technical and research staffs of the Department upon which the former depends for efficiency of much of its work.

"The proposed transfer raises a consideration which is of profound public interest quite aside from any question of proper position of the Forest Service in the framework of the federal government. By virtue of an Executive Order issued

June 10, 1933, an agency transferred from one Department to another loses its statutory position in the classified Civil Service. Any member of the staff of the Forest Service, if it should be transferred, would be subject to separation and other persons would be eligible for appointment quite outside the usual process of Civil Service appointment. In this manner, although motives of the transfer are doubtless entirely above reproach, a faithful public service agency would be exposed to deterioration if not to ruin.

"We know that the business and agricultural interests of the country most intimately related to the national forests, including the forest products industries and the irrigation, livestock and other agricultural interests, are firm in the belief that the national forests should be retained in the Department of Agriculture. In fact, we are convinced that interested farmers and stock raisers believe that if any transfer is desirable, the recently inaugurated control of grazing on the unreserved public domain should be turned over to the Forest Service. The Association of State Foresters officially endorses our position and the American Forestry Association, representing the great public interest in the forests, is emphatically opposed to any change in the status of the public forests. This sentiment, we feel confident, will be shared by the 32,000,000 persons who sought recreation on the national forests in the last fiscal year.

"Speaking for the general public interest, we are certain that the interests of forest conservation, now progressing so satisfactorily, will be far better served by keeping the Forest Service where it is, and we hope that President Roosevelt will agree with it."

S. A. F. COMMITTEE TO COOPERATE WITH  
A. A. A. S.  
JOINT SESSION WITH ECOLOGICAL SOCIETY  
OF AMERICA AT THE A. A. A. S. ANNUAL  
MEETING AT PITTSBURGH

President Chapman, with the approval of the Council, has appointed the following committee to maintain coöperative relations with the American Association for the Advancement of Science: Dr. C. F. Korstian, *Chairman*, Duke University, Durham, North Carolina; Franklin Reed, *Secretary*, Society of American Foresters, Washington, D. C.; Dr. S. T. Dana, School of Forestry, University of Michigan, Ann Arbor, Michigan; Henry I. Baldwin, New Hampshire State Forestry Department, Hillsboro, New Hampshire. Dr. Korstian and Mr. Baldwin have been designated to be the official representatives of the Society of American Foresters at the annual meeting of the American Association for the Advancement of Science at Pittsburgh, Pennsylvania, December 27, 1934, to January 2, 1935.

Meantime arrangements are being made with Dr. A. G. Vestal, Secretary of the

Ecological Society of America, 211 Natural History Building, Urbana, Illinois, for a joint session of the Society of American Foresters and the Ecological Society of America, at which papers will be presented and subjects discussed of mutual interest to foresters and ecologists. All interested members of the Society of American Foresters are urged to attend. Those who desire to take formal part in the program should get in touch immediately with Dr. Vestal, and also with Dr. Korstian, stating the titles of their proposed papers, and the time and facilities required for their presentation. Each title should be accompanied by an abstract of 100 to 150 words, which will be printed in the December number of the Bulletin of the Ecological Society. A copy of the Bulletin will be sent to any member of the Society of American Foresters upon request made to Dr. Vestal.

The joint session will occupy the afternoon of Friday, December 28, in the Cathedral of Learning of the University of Pittsburgh, Room 728.

FRANKLIN REED,  
*Executive Secretary.*



### PLANS FOR THE ANNUAL MEETING

Date—January 28, 29, 30, 1935

Place—Shoreham Hotel, Washington, D. C.

#### COMMITTEE ON ARRANGEMENTS AND PROGRAM

H. H. Chapman, C. M. Granger, G. H. Collingwood, Franklin Reed

#### WOMEN'S COMMITTEE

A committee composed of wives of resident members will be on hand to provide for the comfort and pleasure of visiting members' wives

#### PROGRAM

Tentative, subject to changes and additions of which notice will be given later

JANUARY 28—MORNING SESSION

9:30 A. M.—Opening Preliminaries, President Chapman Presiding

10:00 A. M.—“The Social Aspects of Forestry” or “Forestry and the New Deal”

Chairman —————

Principal Speaker: F. A. Silcox

Discussion Leader: —————

General Discussion

AFTERNOON SESSION

2:00 P. M.—“Progress under Article X of the Lumber Code”

Chairman —————

Principal Speakers: D. T. Mason and John B. Woods

Discussion Leader: —————

General Discussion

EVENING SESSION

Meeting of the Educational Division

(Details in hands of officers of the Division)

JANUARY 29—MORNING SESSION

9:00 A. M.—“Society Affairs”

Chairman: President Chapman

Reports of President, Secretary-Treasurer, Editor-in-Chief, etc., as required by the Constitution. Submission and discussion of committee reports including Game Management with Reference to Forestry, Aldo Leopold, *Chairman*; Forest History, P. G. Redington, *Chairman*; Professional Ethics, John D. Guthrie, *Chairman*; Forest Fire Control, G. H. Collingwood, *Chairman*; Coöperation to Improve Exploitation Practices in South, A. E. Wackerman, *Chairman*; Public Control of Forest Exploitation, H. S. Graves, *Chairman*; Forest Influences and Erosion Control, W. C. Lowdermilk, *Chairman*; and Sub-Committees under Committee on Forest Policy as follows: C. C. C., P. A. Herbert, *Chairman*; Subsistence Homesteads, Axel Oxholm, *Chairman*; Public Acquisition, Verne Rhoades, *Chairman* (tentative).

AFTERNOON SESSION

2:00 P. M.—“Society Affairs” (continued)

Chairman: President Chapman

“An Editorial Policy for the JOURNAL OF FORESTRY.” This promises to be a live topic. Discussion of it and of related questions concerning Society policy as a whole should productively consume the whole afternoon



7:30 P. M.—Annual Banquet

Master of Ceremonies: S. N. Spring

Formal presentation to President Roosevelt (if he finds it possible to attend) of  
Honorary Membership and of the "Schlich Memorial Award"

10:30 P. M.—Adjournment for dancing, cards, or other recreation

## JANUARY 30—MORNING SESSION

9:00 A. M.—"State Forestry—Need and Ways and Means for Strengthening It"

Chairman \_\_\_\_\_

Principal Speaker: Robert M. Ross

Discussion Leader: \_\_\_\_\_

General Discussion

## AFTERNOON SESSION

2:00 P. M.—"Fire and Its Relation to Silviculture in the Southern Pine Region"

Chairman \_\_\_\_\_

Principal Speaker: E. L. Demmon

Discussion Leader \_\_\_\_\_

General Discussion

5:00 P. M. Adjournment



## STILL MORE ABOUT THE EDITORIAL PETITION OF JUNE 13, 1934

Please refer to the material on this subject which appeared in the October and November JOURNALS. We are publishing herewith:

1. A letter to President Chapman, dated October 25, from Walter C. Lowdermilk, who is one of the 12 signers of the petition, and also an associate editor on the JOURNAL's staff.

2. An open letter to the Society's members from Paul Herbert, an associate editor on the JOURNAL's staff who gives his point of view on what motivated the petition.

3. Comment by H. H. Chapman.

4. A statement by Harold Cahill Belyea, a former officer and an active member in the New York Section, who analyzes the contents of the JOURNAL for the past 14 years in order to determine if the 12 petitioners actually have a factual basis for their protest.

There still remains one more opportunity for publication of arguments pro and con this important question of a proper editorial and managerial policy for our magazine. A limited amount of space is being reserved for that purpose in the January, 1935, number. After that comes the annual meeting of the Society, on January 28-30 (see program on another page), at which, during the business session time will be allotted for free interchange of opinion among the members present. With that final discussion as a guide it is hoped that the Council will find it possible to reach a decision.

In this connection, the notice given in the November JOURNAL is repeated here, viz., all the letters from individual members, to which President Chapman refers in his comment on Herbert's statement, have been mimeographed. As long as the supply lasts a set will be sent to any member interested enough to ask for it.

Professor H. H. Chapman, President,  
Society of American Foresters

DEAR PROFESSOR CHAPMAN:

After having read letters in reply to the proposal to modify the editorial policy of the JOURNAL, I would like to amplify my letter of August 12th.

You will recall that a suggestion was made to separate the editorial department from the technical department. It seems to me that a confusion of minds exists as to the solution to the problem raised. It will be impossible for any one man to represent the varied interests of the Society membership; nor should the point of view of any persuasion be squashed. Otherwise we should have a repetition of the action of the Twelve, representing another point of view. The desideratum then is a reasonable freedom of discussion of views of any section or group of the Society, so as to give a well-rounded presentation of the whole forestry problem as it affects land use and the production and disposition of commodities.

To accomplish this objective let the present editorial space be thrown open to and managed by the editor for discussion of policy problems which are prominently before the Society and the Nation. Each contribution to discussion whether by the editor or a contributor would be signed. The editor would not be responsible for a pronouncement of an editorial policy: he would instead be the leader of a forum, stimulating discussion from the membership of the Society.

Let the Council from time to time on the basis of the forum discussion formulate policy pronouncements, to stand as a framework for national policy of the Society. Such pronouncements would be published only on the authority of the Council.

The time has not come for the division of the JOURNAL into two publications. The separation of the JOURNAL into two

departments, one devoted to discussion of issues of policy, in conservation, forestry and land use, and the other to technical papers, is desirable. I would like to see the format changed to provide the full page column for technical articles, and the two column page reserved for the discussion forum.

In all fairness to Franklin Reed who has been doing yeoman service for the Society under the demands of double work, the Society membership owes him its commendation and appreciation. It was my understanding that Reed had accepted the post of editorship with reluctance, and preferred the work of Executive Secretary for which he is splendidly fitted. As a member of the Society and the editorial staff, I want to express my appreciation of Reed's devotion to the interests of the Society and the JOURNAL. It is my opinion, however, that the separation of the two posts is a matter to be worked toward, together with the development of a discussion forum to take the place of editorials.

Very truly yours,

W. C. LOWDERMILK.

#### STATEMENT BY PROFESSOR HERBERT

TO MEMBERS OF THE SOCIETY OF AMERICAN FORESTERS:

The petition of June 13 addressed to the executive council relative to the editorial policy of the JOURNAL OF FORESTRY prefers not to go into specific instances. However, most members of the Society cannot reach a reasoned conclusion on the validity of the petition without further information, and so as Associate Editor of Forest Economics and Policy, the particular field under discussion, I have essayed to assemble "specific instances" for you.

This discussion covers only the period from January, 1933, when Mr. Reed took office as editor-in-chief, to the present; the policies of previous editors are of interest

simply for comparative purposes; a discussion of the short comings of the JOURNAL policies under previous regimes seems fruitless.

If the JOURNAL in its *articles* "lacks the spirit of social leadership" then the responsibility rests jointly upon the editor-in-chief, the writer and the other members of the Society. Mr. Reed can be blamed for not urging me to secure more articles on forest policy of the type desired by the petitioners and I in turn can shift part of the responsibility to other members for not writing their share. As Fritz aptly put it, "What they don't write can't be published."

This point should be clearly understood—Reed has consulted me on every article in my field and has heeded my suggestions on every vital point. Every policy article has been published save one and that one was not written by any of the petitioners. I feel sure that they would have agreed with the editorial board's decision in that particular case!

A specific instance that probably had much to do with the formulation of the petition was the review of the Copeland Report by Gaskill (*Whither Forestry?*—Vol. XXXII, No. 2, pp. 196-201). That monumental report, which will go down in history as the most constructive piece of literature in the American conservation movement in the last quarter century, received a most caustic and destructive review at the hands of an arch-conservative whose particular doctrines were tried and have been found wanting (*Whither Forestry in New Jersey?*—Vol. XXXII, No. 4, pp. 405-410).

Although Dr. Schmitz was then editor in charge of reviews, Reed had the right to and did solicit this review. I believe Reed erred in judgment in requesting such an extremist to prepare that review, although he tells me that he personally did try to encourage other busy men (Gaskill is re-

tired) to write on this 1,677-page report eight months before the review was published. (Vol. XXXI, No. 5, pp. 507.) After receiving the review, Reed recognized its exceedingly uncomplimentary character and consulted with three members of the editorial board as to what he should do. I and the others suggested its publication after he had secured a favorable review to go with it, which he did, although Silcox's reply (Vol. XXXII, No. 2, pp. 202-207) is more of a defense rather than a review. Chapman's editorial "Defeatism in Forestry" (Vol. XXXII, No. 3, pp. 269-271) and Smith's article "Whither Forestry in New Jersey?" were, of course, other answers to Gaskill.

My reasoning in advising the publication of the Gaskill review ran something like this: I don't think it represents at all the consensus of those opposed to the Forest Service viewpoint, it is far too extreme, but the editor asked for it and to refuse to publish it now would certainly open the editorial board to the criticism that it is suppressing "free speech." Perhaps, I erred in judgment and should have advised discarding it and seeking a milder and more representative opposing review.

Another instance that probably rankled the petitioners was the editorial in the January, 1934, issue, "Where is the Money Coming From?" (Vol. XXXII, No. 1). Editorials are not subject to review by the Board, at least that one was not sent to me. I wrote Reed on January 13 as follows: "... the statement I made at the annual meeting, 'that the Society was looking backward,' is not much of an exaggeration. I realize, of course, the Society does not assume responsibility for the editorial. Nevertheless, most of the readers of the JOURNAL will believe that it reflects the viewpoint of many of the leaders in the forestry profession or it would not have been published. I cannot believe that many members of the Society hold the



very narrow, selfish, short-sighted viewpoint held by Mr. Meloney.

"I agree with you that the reactionaries should have their day in court, but I think it is a pity that it should come right at this moment when we are, as a profession, so much in the limelight and subject to critical comment and when a united and forward looking social viewpoint by the profession is so vital. The hundreds of young foresters working under extreme difficulty in the C.C.C. will not be encouraged to greater efforts when they read that editorial. Lucky the cultural foreman who does not see it!

I have still one other criticism of the editorial. Disregarding as best I can the viewpoint expressed, I believe it is very poorly expressed and the title rather ridiculous. He does not answer the question he raises nor anywhere offer a constructive suggestion. I think it distinctly below the high standard that the JOURNAL should set in its editorials.

"I hope that within the next two or three months that you or some one of the officers or members of the Council will write a truly inspired editorial befitting the times." However, other members of the Society have written just as glowing letters in reference to that editorial as mine was caustic.

These are the two principal specific instances that I can find which probably brought about the action of the petitioners, although Reed also has been criticized in permitting the publication of material just *prior* to the Council elections that may have influenced some members' vote—specifically, a laudatory article concerning one of the candidates (The Man Behind Article X.—Vol. XXXI, No. 7, pp.

842), a statement by Chapman opposing public officials on the Council if men of equal merit, etc., can be found elsewhere (Vol. XXXI, No. 6, pp. 730-731), and a statement by a Section favoring particular candidates (Vol. XXXI, No. 5, p. 745). Perhaps, all material that might in any way be interpreted to influence the voting should be held over until after an election. However, the Council unanimously decided that Chapman's statement should be published and hence the responsibility rests with the Council not Reed.

While my personal opinion is that Mr. Reed has a social and economic viewpoint that is not as liberal as that held by 75 per cent of the members of the Society,<sup>1</sup> I nevertheless believe he has done a fine job insofar as the mechanics of issuing the JOURNAL is concerned. With the several associate editors now responsible for the reviews in their particular field and with some supervision of the editorial policy by the Council of the Society I believe it would be difficult to find an editor-in-chief that more fully meets the qualifications set forth by the petitioners.

P. A. HERBERT,  
*Professor of Forestry.*

#### COMMENTS BY PRESIDENT CHAPMAN

The statement of Professor P. A. Herbert, Associate Editor in charge of Economics and Policy, is a most welcome contribution. The most outstanding factor of the numerous replies received to the request for comments on the petition on Editorial Policy signed by 12 members of the Society, was a feeling of mistrust and failure to understand the causes

<sup>1</sup>I do not believe that the 103 letters received from members by Chapman in reference to the petition are at all *representative* of the Society either on the basis of age classes or type of employment. The average age of the writers of the replies I estimate at 48 and a much larger percentage of foresters in private employ, and perhaps in state employ, than in federal employ were included in the replies. I do not wish to imply that younger men should not be guided in part by the experience and judgment of the elders, but in a "representative" sample they cannot be ignored entirely.

of the protest and the motives of the signers.

While certain in my own mind that this protest centered upon the Gaskill review of the Copeland Report and the Meloney editorial entitled, "Where is the Money Coming From?" the petitioners had specifically refused to cite the definite causes of their dissatisfaction.

Mr. Herbert bases his statement on conversations held with several of the petitioners.

Regarding the Gaskill review of the Copeland Report, I will say frankly that Mr. Gaskill's position was exceedingly irritating to me personally. I did not agree with him and his philosophy or conclusions. At the same time, I knew that others who had been solicited for a review had failed to come across and had this review not been published, the whole matter would have gone by the board. Mr. Herbert, in the revision of his first submitted draft, mentions the fact that this review was productive immediately of an editorial entitled, "Defeatism in Forestry" which was especially intended to set forth the fallacies in Gaskill's article; second, of an article by Chief Forester Silcox presenting the official viewpoint on the matter; and third, of an enlightening article by Herbert A. Smith on Gaskill's record in New Jersey, in which he expressed an opinion which I had long held and had never found a proper occasion to put in print. The Copeland Report is not impervious to criticism. It is the function of the Society and the JOURNAL to analyse its findings constructively. While Gaskill's review may not have satisfactorily handled the matter, I sincerely believe it was productive of the kind of discussion and airing which it is the function of the JOURNAL to provide.

One other point is worth emphasizing. Mr. Herbert specifically mentions a statement by me "opposing public officials

for Society officers, if men of equal merit can be found elsewhere." This article before being published or submitted to the editor, was first sent to the former Council, which contained five forest service members and one other from the Department of Agriculture, constituting a majority and which unanimously decided that the article should be published, entirely irrespective of any personal belief in the matter. It was then sent to the editor, who published it. The editor should not be criticised for carrying out the desires of the Council in this respect. This article was based upon a conviction on the part of the writer that the Forest Service was facing the worst crisis of its career; that there was imminent danger that it would be transferred by Executive Order to the Department of the Interior and that if this matter came up in critical form the Society would be completely hamstrung if a member of the Forest Service were then acting as President. Whether the writer's judgment was sound on this matter can be decided by the membership on the basis of the evidence. The Society has had to throw itself into a nation-wide campaign to head off this very danger. The sentiment for election of someone outside the Forest Service at this time was very wide spread and at the time the article was written the writer had not the remotest intention of becoming a candidate. In fact, the circumstances which precipitated his candidacy occurred about two days before the final date for closing of the list. I feel, therefore, that the charge against the editor of playing politics in the JOURNAL is unjust and unwarranted.

Mr. Herbert states that the 103 letters received from members is not at all representative of the Society because the men averaged 48 years of age and that a larger percentage of foresters in private employ were heard from than those in federal employ. In the first place, it was

definitely intended to publish this petition in the JOURNAL at the earliest possible moment which was October, thus giving every member of the Society an opportunity to reply. This has been done. In order, however, to expedite the matter, it was decided to send out about 196 letters to get the sentiment of men occupying positions of responsibility and who might perhaps be held to reflect in a large measure the opinion of the other members whose numbers were so great that the direct appeal to them in advance by letter would not be justified because of the expense. Therefore, the advance letter was sent to men by classes, every individual in the class being communicated with. It was sent to 30 men representing the U. S. Forest Service, including all chiefs of the Regions, directors of forest experiment stations, and several men in the Washington Office; in addition, 34 more members of the Forest Service were included who happen to be officers of different Sections, and in other positions, a total of 64 out of 196 letters. The statistics regarding replies are as follows:

Letters sent	To Forest Service	To all others
196	64	132
Replies received		
103	34	69
Per cent answering	53	52

To cover the remaining field, the letter was sent to every state forester who is a member of the Society, numbering 31; to all chairmen and secretaries of the Sections of the Society, numbering 34; to every head of a forest school, numbering 24; to every secretary of a forestry or conservation association, who was a member of the Society, numbering 18; to the 8 members of the editorial staff; and in addition, so that private forestry and federal employees in bureau other than the Forest

Service might be represented, the letter was sent to a list of 32 men selected at random. In no case did the officers have any knowledge in advance of the opinions of these men, nor did they check up on their ages. If, as Mr. Herbert says, there is a sharp line of cleavage between men above a certain age and in certain positions of responsibility and men below this age who have not yet won their spurs, certainly these younger men are being given every opportunity to express their minds and it is hoped they will do so. I am not quite prepared to accept generalizations on the effect of age on competence in Society affairs.

However, as the question has been raised by Mr. Herbert and Mr. Zon that the sampling method was unrepresentative, it is further submitted that while no deliberate effort was made to work out statistical percentages in which either age or condition of servitude was numerically proportioned, we got the following rather interesting results: (See Table 1, page 630, JOURNAL OF FORESTRY, May, 1934, for employment data.)

The slight excess in education and associations was due to the plan of sending to *all* persons in a given class instead of selected persons. The discrepancy of 7 per cent in the Forest Service was due to a misunderstanding of directions, in sending the letter to only one instead of three men in each regional office.

It is my experience that appeals for opinions published in the JOURNAL do not meet the response that personal letters do. It was for this reason that we assured ourselves of, and obtained, a very wide response because we sent these letters out. The response from the October JOURNAL has been extremely meager, either because

	Forest Service	Educational institutions and association executives	Private foresters	State foresters	All others
	Per cent	Per cent	Per cent	Per cent	Per cent
Employment	40	12	11	16	21
Letters sent	33	22	13	16	16



the members to whom Mr. Herbert refers are satisfied that the question has been covered, or else do not feel the urge to express themselves.

It has been the policy of the officers in endeavoring to ascertain in advance the sentiment of the Society on current questions of importance to communicate with officers of the different Sections, in the belief that these Sections have elected representatives who are capable of determining what the Sections believe and in that way to enable the Council to be guided by average sentiment of the Society. Not only was this done, but the method was greatly expanded in this particular case. If, in spite of all our efforts, we have mistaken the temper of our membership on this question, there will still be ample opportunity afforded at the annual meeting for correcting our mistakes.

H. H. CHAPMAN,  
*President.*

#### THE JOURNAL AND THE RECORD

In a day when nothing seems permanent but change, it was perhaps inevitable that, sooner or later, the JOURNAL and its policy should meet the attention of apostles of alteration. The matter has been vividly brought to the attention of the Society in the petition with twelve signatories as published in the October issue. The sincerity of these gentlemen is unquestioned but it does seem as if a greater part of wisdom might have been exercised in their method of approach and presentation.

To begin with, the editorial policy of the JOURNAL must be and is determined by the Executive Council of the Society. The Council cannot escape that responsibility nor has there been evident any tendency to shirk it. It would seem that the first step on the part of any group not satisfied with the editorial policy

should be that of taking the matter up with the directorate in the Council. If the Executive Council was not fully sympathetic, it would seem that the next logical step would be to sound out the opinion in the Society at large through consultation with the different sections. The Executive Council would perhaps be more sympathetic to a proposal emanating from several sections than the same proposal coming mainly from but one section only. Nor can any great degree of admiration be extended to any group who approach the Executive Council, or the Society at large, with a club in hand. The demand for immediate appeal to the membership at large would seem to be a matter of last resort rather than immediate expediency. There is great peril in such move of destroying more than is accomplished. Unless care is taken, tolerance observed, and restraint imposed, there is grave danger of acrimonious animosity with personalities involved. When that happens, it is usually fatal to fair judgment. Ajax inviting the lightnings may be a very heroic figure but Columbus testing straws in the wind shows the better judgment.

In the next place, it seems that in the preamble to the petition some rather broad generalities have been made and sweeping conclusions implied with but small attention to supporting data. One of the major complaints turns upon alleged lack of leadership in the JOURNAL in its failure to indulge in longer and larger discussions of forest policy. The private opinion of the writer has been that the columns of the JOURNAL have shown too great a devotion to policy articles much to the detriment of its leadership in the more technical phases of the profession. But having a pronounced dislike against unsupported generalities and somewhat of a predelection for conclusions based on factual actualities, a condition which in all modesty

is believed to be worthy of imitation, judgment was reserved until definite information could be obtained.

The facts in the case are readily available. They are in the columns of the JOURNAL itself. Here is a case where the proof of the eating is in the pudding. So, to paraphrase the words of one of our most brilliant politicians, let's "consult the record." The results of the investigation of the matters discussed in the JOURNAL from January 1st, 1917 to October 1, 1934 are presented in Table 1.

Some explanation of this classification

may be in order especially in reference to articles classed under forest policy. The Society of American Foresters by adopted committee report defines forest policy as "the attitude toward forests and general method of administration of public interests in forests by the state." As far as articles accepted by and printed in the JOURNAL are concerned, perhaps Fritz's definition i.e. "that forestry is a necessary thing" might be even better. In the classification, many articles were examined and studied. Some admitted by title at once that policy was the sub-

TABLE 1  
ANALYSIS OF JOURNAL CONTENTS

Period	January 1917 to February 1923	March 1923 to May 1928	Oct. 1928 to May 1930	May 1930 to Dec. 1932	Dec. 1932 to October 1934	1917 to 1934
Editor	Fernow	Zon	Dana	Fritz	Reed	.....
Total No. of pages.....	5,988	5,400	2,157	2,631	1,807	17,983
No. of pages devoted to						
a. Editorials.....	104	43	22	43	34	246
b. Reviews & Notes.....	1,539	1,059	476	521	262	3,857
c. Society Affairs.....	439	493	278	361	315	1,886
Per cent of total space devoted to standard depts. ....	34.9	29.5	36.0	35.2	33.8	33.3

Per Cent of Contributors' Space Devoted to the Several Subjects

Forest policy.....	27.5	15.3	30.9	15.7	34.6	22.7
Forest economics and land use.....	6.4	4.8	1.9	2.5	2.1	4.4
Forest management.....	6.3	6.7	1.4	4.7	3.4	5.4
Forest research & re- search methods.....	1.6	1.5	2.5	1.6	1.5	1.7
Dendrology and wood technology.....	4.6	3.5	4.0	1.9	2.5	3.6
Silviculture.....	14.4	13.3	16.7	13.6	10.5	13.9
Forest finance.....	3.8	5.1	1.8	5.2	3.3	4.1
Forest mensuration & growth.....	9.9	9.8	4.2	12.5	3.4	8.9
Forest ecology.....	8.1	3.5	4.8	3.4	2.9	5.0
Forest pathology.....	2.5	2.7	2.0	4.7	5.0	3.1
Forest entomology.....	1.4	3.2	2.5	2.2	3.1	2.4
Forest fire protection.....	2.5	5.7	3.9	6.9	5.9	4.7
Utilization.....	2.0	4.8	4.4	6.1	6.4	4.2
Range management & grazing.....	0.4	2.6	0.6	0.1	1.0	1.1
Forest education.....	1.4	4.8	1.6	1.5	2.9	2.7
Forest administration.....	3.1	0.5	0.6	2.1	0.4	1.6
Forest animals & game management.....	0.8	1.4	7.3	4.1	2.3	2.3
Forest recreation.....	0.2	0.6	2.4	0.5	0.4	0.6
Forest extension.....		1.4	1.3	1.6	0.9	0.9
General & miscellaneous	3.1	8.8	5.2	9.1	6.0	6.5

ject treated. Others had to be read to determine the intent of the author. As it stands, forest policy includes all articles advocating a panacea, a program or a pogrom for more and better forests, for more and better forestry. Articles reporting on policy established by legislation such as methods of brush disposal in certain states or distribution of free planting stock in others were classified under forest administration, though according to interpreted official definition their final classification might be otherwise. The "General and miscellaneous" class takes in all articles incapable of other classification such as Leopold's article on "Forestry in the Bible" and various reports of European conferences and meetings.

It appears from the tabulation that in the past seventeen years the JOURNAL has published some 17,938 pages of printed matter. Of this amount, some 5,989 pages were devoted to Editorials, Notes and Reviews, and Society Affairs. Of the 11,949 pages offered for publication of contributed articles, no less than 2,648 pages or 22.3 per cent of the space has been devoted to discussions of forest policy. Allowing 732 words to the page, a figure arrived from a count of several standard pages, we have in this issue been subjected to a bombardment of approximately 1,938,336 words on this one subject alone. On the face of it, it seems more than enough. As a rule, we have been devoting almost twice as much space to discussions of forest policy as has been given to silviculture (the next largest), the art and technique of all forestry.

In view of the statements contained in the preamble of the petition with twelve signatories, one other comparison is in

order. That is, in the last two years, since January 1933, the relative amount of space given to discussions of forest policy exceeds the largest amount of space offered to such articles by any previous editor by 12.0 per cent and exceeds the average for the fifteen previous years by some 52.6 per cent. It is also to be pointed out that the policy of the Society in regard to the JOURNAL as stated on its title page is that it shall be "A Professional Journal Devoted to All Branches of Forestry," and more equitably we hope, in proportion to their relative importance.

No one will oppose, at least in principle, the separation of the office of the editor-in-chief of the JOURNAL from that of Executive Secretary of the Society. The question arises as to the expediency of insisting upon it at this time. Since the very institution of the Society, the activities of the editorships of its various publications have been undertaken as a labor of love, purely, by the several incumbents of the office. That time seems well past and one of the major problems of the Executive Council is to determine ways and means whereby a competent editor-in-chief may be obtained at a salary adequate for the task. The only source of such revenue is from the membership itself. And the only way it can be accomplished is by an increase in the membership dues. This cannot be lost sight of. Whether present membership dues are too high or too low, or whether the present is the time for an increase is another matter. Perhaps in a spirit of altruism, the twelve signatories might be willing to donate a portion, or all, of the funds which are claimed available for the publication of another separate organ.

HAROLD C. BELYEA.



## ELECTIONS TO MEMBERSHIP

The following men have been elected to the grade of membership indicated:

## ALLEGHENY SECTION

*Junior Membership*

Francis, Edwin H.  
Gates, Earl Frank  
Kline, L. V.  
Kuppe, Adolph Joseph  
Meekins, E. H.  
Phelps, Chester F.  
Randall, Arthur G.  
Rea, Russel E.  
Simmons, Edward M.  
Somers, Capt. Gayle H.

## APPALACHIAN SECTION

*Junior Membership*

Albert, Otis W.  
Blackerby, J. Harton  
Cooper, Edward N.  
Croker, Thos. G.  
Dietrick, A. Norman  
Giddings, Edwin L.  
Henninger, Charles M.  
Hicks, John R.  
Hinson, Ernest  
Lane, W. Lewis  
Langford, Frank Mayne  
Ludgate, V. Roswell  
Mazurak, Andrew Peter  
Millar, Richard Hardy  
Mitchell, John C.  
Nutting, Ernest  
Olson, John U.  
Phillips, William A.  
Riley, Madison Monroe  
Savage, Neil S.  
Swarthout, Arthur Paul  
Wood, Richard Austin

*Senior Membership*

Graeber, R. W.  
Kramer, William P.  
Swenning, Karl A.

## CALIFORNIA SECTION

*Junior Membership*

Wood, Roger V.

*Senior Membership*

Barker, Claude K.  
Clar, C. R.  
Mason, Ira J.  
Righter, Francis I.  
Schofield, W. R.

CENTRAL ROCKY MOUNTAIN  
SECTION*Junior Membership*

Nordwall, David S.  
Smith, Chas. E.  
Wilson, R. G.

## CENTRAL STATES

*Junior Membership*

Bohleber, Carl F.  
Brands, Andrew  
Davis, Roy M.  
Degler, R. H.  
Hall, Harold F.  
Jacobson, Albin George  
Kroeber, John K.  
Preston, Ronald J.  
Sears, Esmond W.  
Weight, Forrest F.

## GULF STATES SECTION

*Junior Membership*

Barton, J. E.  
Lehman, John William  
Sentell, Nathaniel Wesley  
Smith, Horace E.

## INTERMOUNTAIN SECTION

*Senior Membership*

Potter, Author

## MINNESOTA SECTION

*Junior Membership*

Nelson, Ralph William  
Seastrom Paul N.  
Stewart, Donald M.

## NEW ENGLAND SECTION

*Junior Membership*

Boutwell, Samuel Arthur  
Christie, Arthur Hallock  
Johnson, Harold B.  
Olson, A. Richard  
Perry, Richard A.  
Shaw, Ezra I.

*Senior Membership*

Ashman, Robert I.  
Boomer, Stephen H.  
Bradder, Wilbur E.  
Brockway, Earle M.  
Gilmour, John Douglas  
Jensen, Victor S.  
McLaughlin, R. P.  
Shepard, William Chambers

## NEW YORK SECTION

*Junior Membership*

Hamlin, Edgar G.  
Hauser, Charles William  
Smith, Vedene H.  
Sydansk, Ray  
Sypulski, John L.  
Waldenberger, Emile R.

*Senior Membership*

Dobbins, Harry E.

NORTHERN ROCKY MOUNTAIN  
SECTION*Junior Membership*

Evenson, Millard C.  
Guntermann, Wm. E.  
Seymour, Wellington G.

*Senior Membership*

Abbott, A. H.  
Fields, Ralph E.  
Gerrard, Paul H.  
Hurt, L. C.  
Joy, C. A.  
Klehm, K. A.  
Melis, Percy E.  
Muck, Lee F.  
Simpson, Alva A.  
Sowder, Arthur M.  
Space, Ralph S.  
Templar, J. N.  
Urquhart, J. C.

## OZARK SECTION

*Junior Membership*

Bigley, Michael  
Fletcher, Peter Whitcomb  
Howland, C. F.  
Lary, George  
McPherson, Joseph  
Monroe, A. F.  
O'Donnell, Hugh O.  
Penley, Joseph I.  
Stauffer, Donald Edward  
Westphal, Alvin E.

## SOUTHEASTERN SECTION

*Junior Membership*

Ernest, Albert D.  
Grogan, Harold L.  
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Saari, Eino Armas

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Stuart, R. Y.

*Senior*

Miller, F. G.

*Junior*

Jordan, C. E.

*Associate*

Green, Thornton A.

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Clement, George E.  
Helphenstine, R. K.  
Pearce, W. J.  
Whitham, J. E.

*Junior*

Cooper, Sidney N.  
Elliott, Harry  
Hill, William N.  
Keur, John Y.  
Klein, C. Cyril  
Knull, Josef N.  
McLean, L. H.  
McNerney, Edward J.  
Richardson, LeRoy M.  
Sifferlen, Charles E.  
Sipe, F. Henry  
Stell, Fred  
Stewart, George  
Swartz, U. S.  
Wilson, W. I.  
Woodman, J. F.

*Associate*

Burns, George P.

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*Senior*

Adams, J. A.  
Arthur, O. Fred  
Gruhn, George H.  
Jacobson, Norman G.  
Kupfer, C. A.  
Mason, F. R.  
Nagel, W. M.  
Oppel, A. F.  
Peterson, Carl I.  
Rogers, J. S.  
Smith, Homer A.  
White, David G.  
Whitney, Alvin

*Junior*

Balch, A. P.  
Barrus, George Latta  
Bassett, E. W.  
Bauer, Eitel  
Bramhall, Albert W.  
Brenneis, Andrew G.  
Christensen, Irving L.  
Christensen, Ivan  
Clemmensen, Niels K.  
Cummings, Lewis A.  
Davis, Robert  
Denton, Walter B.  
DuMond, F. L.  
DuPuis, Jean M.  
Eastman, A. W.  
Fitting, Ray R.  
Foltz, Frank  
Francis, Henry R.  
French, Harry H.

Frost, Clyde N.  
Gross, Elroy H.  
Gurr, James E.  
Hall, C. C.  
Hillman, W. P.  
Hutchins, Maxwell C.  
Jack, Harvey C.  
Jones, Fred J.  
Jones, John Davis  
King, Charles K.  
Langdell, R. S.  
Locke, John P.  
Malsberger, Henry J.  
Marsh, A. Fletcher  
Marsh, John T.  
MacLay, R. D.  
McDuff, Clifford Earl  
McPherson, Lester J.  
Merryfield, L. A.  
Moore, Wm. H.  
Moore, Wm. Leon  
Pearson, Thomas V.  
Peel, W. F.  
Phipps, Carl L.  
Ratlift, Mark R.  
Raupach, Carl V.  
Scribner, C. H.  
Scott, James E.  
Space, Jackson W.  
Swim, C. B.  
Tennant, R. E.  
Thurmond, Jack  
Tyler, John W.  
West, J. William  
Wible, Ralph C.  
Wilde, Kenneth E.

*Associate*

Speh, C. F.  
Leavitt, Scott  
Shoemaker, Henry W.

## ANNOUNCEMENT OF CANDIDATES FOR MEMBERSHIP

The following names of candidates for membership are referred to Junior Members, Senior Members and Fellows for comment or protest. The list includes all nominations received since the publication of the list in the November JOURNAL, without question as to eligibility. The names have not been passed upon by the Council. Important information regarding the qualifications of any candidate, which will enable the Council to take final action with a knowledge of essential facts, should be submitted to the undersigned before January 10, 1935. Statements on different men should be submitted on different sheets. Communications relating to candidates are considered by the Council as strictly confidential.

## FOR ELECTION TO GRADE OF JUNIOR MEMBERSHIP

<i>Name and Education</i>	<i>Title and Address</i>	<i>Proposed by Section</i>
Alter, Norman B. Pa. State; N. C. State, B.S.F., 1931.	Technician, Cherokee N. F., U.S. F.S., Athens, Tenn.	Appalachian
Anderson, David A. Pa. State, B.S.F., 1934.	Blister Rust Checker, Dept. of Forests and Waters, Pittston, Pa.	Allegheny
Andra, Harvey J. N. Y. State, B.S.F., 1931.	Woods Foreman, Stony Creek Camp, Chillicothe, Ohio.	Central States
Bonninghausen, Russel A. Univ. of Mich., B.F., 1930.	Technical Foreman, E.C.W. Camp, Pikeville, Tenn.	Appalachian
Burger, Clarence Edwin Mich. State, B.S.F., 1931; M.S.F.	Technical Forester, Alvin C. York Camp, Palmer, Tenn.	Appalachian
Chatfield, Emery E. N. C. State, B.S.F., 1934.	Cultural Foreman, Camp S.C.F. 1, Mountain Rest, S. C.	Appalachian
Corpening, B. H. N. C. State, B.S.F., 1934.	Cultural Foreman, C.C.C. Camp F-5, Clayton, Ga.	Appalachian
Crow, A. Bigler N. C. State, B.S.F., 1934.	Junior Forester, U. S. F. S., Rolla, Mo.	Ozark
Doerrie, Fred N. C. State, B.S.F., 1934.	Technician (Junior Forester) U. S. F. S., Appalachian Forest Exp. Sta., Asheville, N. C.	Appalachian
Hairr, Leland B. N. C. State, B.S.F., 1934.	Forestry Staff, Soil Erosion Service, High Point, N. C.	Appalachian
Hervey, David E. Univ. of Wash., B.S.F.	Junior Forester, U. S. F. S., Asheville, N. C.	Appalachian
Huckenpahler, B. J. Univ. of Minn., B.S.F., 1931; M.S., 1933.	Ass't Forester, Soil Erosion Service, High Point, N. C.	Appalachian
Kilmer, Frank J. Pa. State, B.S.F., 1928.	Forester, E.C.W. Camp No. 138, Morris, Pa.	Allegheny
Kroll, William H. Mich. State, B.S.F., 1930.	Soil Erosion Work, C.C.C. Camp 59 P. E., Oak Hill, Ill.	Central States
Kuhn, Frank A. N. Y. Ranger School, 1927; one term, Univ. of Idaho.	U. S. F. S., Alabama N. F., Moulton, Ala.	Appalachian
Mayer, Karl R. Pa. State, B.S.F., 1931.	Acquisition Technician, Cherokee N. F., Athens, Tenn.	Appalachian
McLaughlin, J. Ross Colo. Agric., B.S.F., 1934.	Compassman, Rio Grande N. F., Fort Collins, Colo.	Central Rocky Mt.
McMillen, John M. Univ. of Minn., B.S.F., 1933.	Senior Scientific Aid, Forest Products Laboratory, Madison, Wis.	Minnesota
Miles, Richard Vance, Jr. La. State, B.S.F., 1933.	Assistant Forest Ranger, Cherokee N. F., Cleveland, Tenn.	Appalachian
Miller, Frank J. Pa. State, 2 years; N. C. State, B.S.F., 1934.	Estimator, Ass't to Technician, De Sota N. F., Brookhaven, Miss.	Gulf States
Morgan, Kenneth J. Cornell, B.S.F., 1934.	Technician, (Junior Forester) Appalachian Forest Exp. Sta., Asheville, N. C.	Appalachian
Page, Charles R. N. Y. State, B.S.F., 1934.	Field Asst., Central States Forest Exp. Sta., Columbus, Ohio.	Central States
Patterson, William Gilmer Purdue, B.S.F., 1932.	Asst. Technician, Southern Forest Exp. Sta., New Orleans, La.	Gulf States
Pierce, Fred W. Mich. State, B.S.F., 1928.	E.C.W. Technician, U. S. F. S., Milwaukee, Wis.	Central States
Prout, C. T., Jr. N. C. State, B.S.F., 1934.	Acquisition, U. S. F. S., New Bern, N. C.	Appalachian
Shugart, Arthur George N. C. State, B.S.F., 1934.	Cultural Foreman, C.C.C. Camp F-2, Walhalla, S. C.	Appalachian
Smith, Walton R. N. C. State, B.S.F., 1934.	Cultural Foreman, C.C.C. Camp F-1 Mountain Rest, S. C.	Appalachian
Thorpe, John Owen N. Y. State, B.S.F., 1930.	Cultural Foreman, C.C.C., Co. 1280, Sussex, N. J.	Allegheny
VanSickle, Francis Saxton Univ. of Mich., B.S.F., 1934.	Graduate Student, University of Mich., Ann Arbor, Mich.	Central States



<i>Name and Education</i>	<i>Title and Address</i>	<i>Proposed by Section</i>
Warner, John DeWitt Cornell, B.S.F., 1932.	Forestry Foreman, Indiana Conservation Dept., Medaryville, Ind.	Central States
Welch, Jerry James Cornell, B.S.F., 1932.	Cultural Foreman, Nantahala N. F., Mountain Rest, S. C.	Appalachian
Wright, Newell L. Univ. of Wash., B.S.F., 1913.	Asst. in E.C.W. work, District Engineer R-6, Portland, Ore.	North Pacific

## FOR ELECTION TO GRADE OF SENIOR MEMBERSHIP

Miller, A. F. Iowa State, B.S.F., 1924. (Junior Member, 1926.)	Supervisor, Manistee Purchase Unit, Manistee, Michigan.	Central States
--	---	----------------

## FOR ELECTION TO GRADE OF CORRESPONDING MEMBERSHIP

Fail, Vivian Taiaroa Three years secondary education, passed public service, entrance and N. Z. University Matriculation.	Forestry Administrator and New Zealand Manager, Afforestation Proprietary Limited, 413 Collins St., Melbourne, Australia.	Clyde Leavitt L. MacIntosh J. B. Woods
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1934

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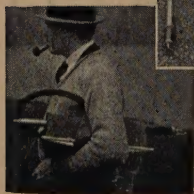
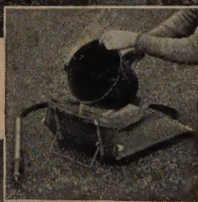
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